

	Final Report
V	Revised Report

Report Date: 10-Jan-18 17:16

Laboratory Report SC40225

Gulf Oil L.P. 281 Eastern Avenue Chelsea, MA 02150 Attn: Andrew P. Adams

Project: Gulf Terminal - Chelsea, MA

Project #: Gulf Chelsea

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.

All applicable NELAC requirements have been met.

Massachusetts # M-MA138/MA1110 Connecticut # PH-0777 Florida # E87936 Maine # MA138 New Hampshire # 2972/2538 New Jersey # MA011 New York # 11393 Pennsylvania # 68-04426/68-02924 Rhode Island # LAO00348 USDA # P330-15-00375 Vermont # VT-11393



Authorized by:

Dawn Wojcik Laboratory Director

Vaun & Woscik

Eurofins Spectrum Analytical holds primary certification in the State of Massachusetts for the analytes as indicated with an X in the "Cert." column within this report. Please note that the State of Massachusetts does not offer certification for all analytes. Please refer to our website for specific certification holdings in each state.

Please note that this report contains 27 pages of analytical data plus Chain of Custody document(s). When the Laboratory Report is indicated as revised, this report supersedes any previously dated reports for the laboratory ID(s) referenced above. Where this report identifies subcontracted analyses, copies of the subcontractor's test report are available upon request. This report may not be reproduced, except in full, without written approval from Eurofins Spectrum Analytical, Inc.

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Please contact the Laboratory or Technical Director at 800-789-9115 with any questions regarding the data contained in this laboratory report.

Sample Summary

Work Order: SC40225

Project: Gulf Terminal - Chelsea, MA

Project Number: Gulf Chelsea

Laboratory ID	Client Sample ID	<u>Matrix</u>	Date Sampled	Date Received
SC40225-01	Chelsea Creek	Surface Water	11-Oct-17 08:45	11-Oct-17 15:45
SC40230-01	Outfall 003	Surface Water	11-Oct-17 09:00	11-Oct-17 15:45

CASE NARRATIVE:

Data has been reported to the MDL. This report includes estimated concentrations detected below the RDL and above the MDL (J-Flag).

All non-detects and all results below the detection limit are reported as "<" (less than) the detection limit in this report.

The samples were received 4.2 degrees Celsius, please refer to the Chain of Custody for details specific to temperature upon receipt. An infrared thermometer with a tolerance of +/- 1.0 degrees Celsius was used immediately upon receipt of the samples.

If a Matrix Spike (MS), Matrix Spike Duplicate (MSD) or Duplicate (DUP) was not requested on the Chain of Custody, method criteria may have been fulfilled with a source sample not of this Sample Delivery Group. If method or program required MS/MSD/Dup were not performed, sufficient sample was not provided to the laboratory.

Analyses for Total Hardness, pH, and Total Residual Chlorine fall under the state of Pennsylvania code Chapter 252.6 accreditation by

Please note that this report contains 30 pages of analytical data from New England Biossay, A Division of GZA.

Noember 10, 2017 Report Revision Case Narrative:

This report has been revised to update the analyte list for 8270 Phenols (on SC40230 Outfall 0003 sample) per client request.

See below for any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

E350.1

BZ19754-MS

This parameter is outside laboratory ms/msd specified recovery limits.

Ammonia as Nitrogen

EPA 200.8

Samples:

SC40225-01

Chelsea Creek

Sample required a dilution due to low internal standard recovery of the lesser diluted digestion, reporting limit is elevated.

Cadmium

Copper

Lead

Nickel

Zinc

SW846 8260C

Calibration:

1710006

Analyte quantified by quadratic equation type calibration.

Naphthalene

SW846 8260C

Calibration:

1710006

This affected the following samples:

1717339-BLK1

1717339-BS1

1717339-BSD1

Chelsea Creek

Outfall 003

S708779-ICV1

S709010-CCV1

Samples:

S709010-CCV1

Analyte percent difference is outside individual acceptance criteria (20), but within overall method allowances.

Methyl tert-butyl ether (29.4%)

This affected the following samples:

1717339-BLK1

1717339-BS1

1717339-BSD1

Outfall 003

SW846 8270D

Samples:

SC40230-01RE1

Outfall 003

Duplicate analysis confirmed surrogate failure due to matrix effects.

2-Fluorophenol

Phenol-d5

SW846 8270D SIM

Calibration:

1709035

Analyte quantified by quadratic equation type calibration.

Benzo (a) pyrene

This affected the following samples:

1717566-BLK2

1717566-BS2

1717566-BSD2

Chelsea Creek

S708328-ICV1

S709250-CCV1

S709296-CCV1

Samples:

S709250-CCV1

Analyte percent difference is outside individual acceptance criteria (20), but within overall method allowances.

Acenaphthene (23.9%)

SW846 8270D SIM

Samples:

S709250-CCV1

This affected the following samples:

1717566-BLK2 1717566-BS2 1717566-BSD2

SC40230-01RE1 Outfall 003

Sample was originally analyzed within the recommended method holding time; however, QC materials for the sample run were out of control. As a result, the sample was immediately re-analyzed (outside the holding time).

SW9222D-06

Samples:

SC40230-01 Outfall 003

Sample was received past hold time for Fecal Coliforms (SW9222D).

Fecal Coliforms

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Sample Acceptance Check Form

Client:	Gulf Oil L.P.			
Project:	Gulf Terminal - Chelsea, MA / Gulf Chelsea			
Work Order:	SC40225			
Sample(s) received on:	10/11/2017			
The following outlines to	he condition of samples for the attached Chain of Custody upon receipt.			
		<u>Yes</u>	No	<u>N/A</u>
Were custody se	als present?		\checkmark	
Were custody se	als intact?			✓
Were samples re	seeived at a temperature of ≤ 6 °C?	\checkmark		
Were samples co	poled on ice upon transfer to laboratory representative?		√	
Were samples re	frigerated upon transfer to laboratory representative?		\checkmark	
Were sample co	ntainers received intact?	\checkmark		
	roperly labeled (labels affixed to sample containers and include sample ID, site project number and the collection date)?	\checkmark		
Were samples ac	ecompanied by a Chain of Custody document?	\checkmark		
include sample	Custody document include proper, full, and complete documentation, which shall ID, site location, and/or project number, date and time of collection, collector's name, e, sample matrix and any special remarks concerning the sample?	V		
Did sample cont	ainer labels agree with Chain of Custody document?	$\overline{\checkmark}$		
Were samples re	ceived within method-specific holding times?	<u> </u>		

Sample Acceptance Check Form

Client:	Gulf Oil L.P.			
Project:	Gulf Terminal - Chelsea, MA / Gulf Chelsea			
Work Order:	SC40230			
Sample(s) received on:	10/11/2017			
The following outlines to	he condition of samples for the attached Chain of Custody upon receipt.			
		Yes	<u>No</u>	<u>N/A</u>
Were custody se	als present?		✓	
Were custody se	als intact?			\checkmark
Were samples re	seeived at a temperature of $\leq 6^{\circ}$ C?	\checkmark		
Were samples co	poled on ice upon transfer to laboratory representative?		✓	
Were samples re	frigerated upon transfer to laboratory representative?		✓	
Were sample co	ntainers received intact?	\checkmark		
1 1	roperly labeled (labels affixed to sample containers and include sample ID, site project number and the collection date)?	~		
Were samples ac	ecompanied by a Chain of Custody document?	✓		
include sample l	Custody document include proper, full, and complete documentation, which shall (D, site location, and/or project number, date and time of collection, collector's name, e, sample matrix and any special remarks concerning the sample?			
Did sample cont	ainer labels agree with Chain of Custody document?	~		
Were samples re	ceived within method-specific holding times?	✓		

Summary of Hits

Lab ID: SC40225-01

Client ID: Chelsea Creek

Outfall 003

mg/l

mg/l

mg/l

/100 mls

SM2540D (11)

SW9222D-06

SM4500-Cl-G (11)

SM5310B (00, 11)

Parameter	Result	Flag Reporting Limit	Units	Analytical Method
Ammonia as Nitrogen	0.17	0.05	mg/L	E350.1
Copper	110	DL-15 10	$\mu g/L$	EPA 200.8
Salinity	26.1	1.00	ppt (1000)	SM 2520 (01)
Total Solids	47800	500	mg/l	SM2540 B (11)
Total Suspended Solids	15.0	1.7	mg/l	SM2540D (11)
Total Organic Carbon	2.37	1.00	mg/l	SM5310B (00, 11)

Lab ID: SC40230-01

Total Suspended Solids

Total Residual Chlorine

Total Organic Carbon

Fecal Coliforms

Copper

Lead

Zinc

Nickel

Parameter Result Flag **Reporting Limit** Units **Analytical Method** Ammonia as Nitrogen 0.23 0.05 mg/LE350.1 Chromium 1.6 J 10 $\mu g/L$ EPA 200.8 5.4 1.0 $\mu g/L$ EPA 200.8 4.0 0.50 $\mu g/L$ EPA 200.8 5.0 EPA 200.8 1.8 J $\mu g/L$ 10 20 $\mu g/L$ EPA 200.8 **Total Solids** 120 5.00 mg/lSM2540 B (11)

0.5

0.020

1.00

10

Client ID:

Please note that because there are no reporting limits associated with hazardous waste characterizations or micro analyses, this summary does not include hits from these analyses if included in this work order.

Q1

7.4

0.043

4.64

850

Sample Id Chelsea C SC40225-				Client Programme Gulf Cl	-		Matrix Surface Wa		ection Date -Oct-17 08			ceived Oct-17	
CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Volatile O	rganic Compounds												
	rganic Aromatics by SW84												
	by method SW846 5030 V												
71-43-2	Benzene	< 1.0		μg/l	1.0	0.3	1	SW846 8260C	12-Oct-17	13-Oct-17	GMA	1717339	
100-41-4	Ethylbenzene	< 1.0		μg/l	1.0	0.3	1	"	"	"	"	"	
91-20-3	Naphthalene	< 1.0		μg/l	1.0	0.4	1	"	"	"	"	"	
108-88-3	Toluene	< 1.0		μg/l	1.0	0.3	1	"	"	"	"	"	
179601-23-1	m,p-Xylene	< 2.0		μg/l	2.0	0.4	1	"	"	"	"	"	
95-47-6	o-Xylene	< 1.0		μg/l	1.0	0.3	1	ıı .	n n	u	"	"	
Surrogate r	recoveries:												
460-00-4	4-Bromofluorobenzene	102			70-13	80 %		п	"	u	"	"	
2037-26-5	Toluene-d8	99			70-13	80 %		п	"	u	"	"	
17060-07-0	1,2-Dichloroethane-d4	120			70-13	80 %		"	"	"		"	
1868-53-7	Dibromofluoromethane	107			70-13	80 %		"	u u	"	"	"	
Semivolati	le Organic Compounds by	GCMS											
SVOCs by	y SIM												
Prepared	by method SW846 3510C	<u>.</u>											
83-32-9	Acenaphthene	< 0.046		μg/l	0.046	0.007	1	SW846 8270D SIM	17-Oct-17	19-Oct-17	MSL	1717566	
208-96-8	Acenaphthylene	< 0.046		μg/l	0.046	0.012	1		"	u		"	
120-12-7	Anthracene	< 0.046		μg/l	0.046	0.007	1		"	"	"	"	
56-55-3	Benzo (a) anthracene	< 0.046		μg/l	0.046	0.016	1	"	u u	"	"	"	
50-32-8	Benzo (a) pyrene	< 0.046		μg/l	0.046	0.019	1	"	"	"	"	"	
205-99-2	Benzo (b) fluoranthene	< 0.046		μg/l	0.046	0.019	1	"	"	"	"	"	
191-24-2	Benzo (g,h,i) perylene	< 0.046		μg/l	0.046	0.018	1	"	"	"			
207-08-9	Benzo (k) fluoranthene	< 0.046		μg/l	0.046	0.017	1	"	"	u	"	"	
218-01-9	Chrysene	< 0.046		μg/l	0.046	0.004	1	"	"	"		"	
53-70-3	Dibenzo (a,h) anthracene	< 0.046		μg/l	0.046	0.017	1	"		"	"	"	
206-44-0	Fluoranthene	< 0.046		μg/l	0.046	0.004	1	"	"	"		"	
86-73-7	Fluorene	< 0.046		μg/l	0.046	0.011	1	"	"	"	"	"	
193-39-5	Indeno (1,2,3-cd) pyrene	< 0.046		μg/l	0.046	0.020	1	"	"	"		"	
91-20-3	Naphthalene	< 0.046		μg/l	0.046	0.020	1	"	"	"	"	"	
85-01-8	Phenanthrene	< 0.046		μg/l	0.046	0.008	1	"	"	"	"		
129-00-0	Pyrene	< 0.046		μg/l	0.046	0.006	1	"	"	"	"		
		- 0.010		P9/1	0.010	0.000	<u> </u>						
Surrogate r					00.40			,,					
	Benzo (e) pyrene-d12	30			30-13	80 %							
General C 7782-50-5	hemistry Parameters Total Residual Chlorine	< 0.020	CIHT	mg/l	0.020	0.006	1	SM4500-CI-G	14-Oct-17		RLT	1717498	Х
	рН	7.64	pН	pH Units			1	(11) ASTM D	10:09 11-Oct-17	17:26 19-Oct-17	TN	1717324	Х
	Salinity	26.1	•	ppt (1000)	1.00	0.144	1	1293-99B SM 2520 (01)	14:30	13:34 18-Oct-17	BD	1717670	
	Total Solids		LIV			153	1			18-Oct-17	CMB	1717579	
		47,800	LIV	mg/l	500			SM2540 B (11)					
	Total Suspended Solids	15.0		mg/l	1.7	0.7	1	SM2540D (11)		18-Oct-17	CMB	1717578	
	Total Organic Carbon	2.37		mg/l	1.00	0.238	1	SM5310B (00, 11)	19-001-17	19-Oct-17	RLT	1717748	٨

Metals Analyses (Total)

Analysis performed by Con-Test Analytical Laboratory - MJH

Sample Id Chelsea (SC40225					Project # Chelsea		Matrix Surface Wa		ection Date I-Oct-17 08			Oct-17	
CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
Metals An	nalyses (Total)												
Analysis p	performed by Con-Test Analy	rtical Laborator	ry - MJH										
7440-43-9	Cadmium	< 2.0	DL-15	μg/L	2.0	0.95	10	EPA 200.8	17-Oct-17 12:05	18-Oct-17 12:26	MJH	B188766	
Analysis p	erformed by Con-Test Analy	rtical Laborator	ry - MJH										
7440-50-8	Copper	110	DL-15	μg/L	10	3.6	10	"	"	"	"	"	
Analysis p	erformed by Con-Test Analy	rtical Laborator	ry - WSD										
7439-92-1	Lead	< 25	DL-15	μg/L	25	6.9	50	"	"	18-Oct-17 14:06	"	"	
Analysis p	erformed by Con-Test Analy	rtical Laborator	ry - MJH										
7440-02-0	Nickel	< 50	DL-15	μg/L	50	3.7	10	"	"	18-Oct-17 12:26	"	"	
Analysis p	erformed by Con-Test Analy	rtical Laborator	ry - MJH										
7440-66-6	Zinc	< 200	DL-15	μg/L	200	49	10	"	"	"	"	"	
	acted Analyses by method 405439												
Analysis p	erformed by Phoenix Enviro	onmental Labs,	Inc. * - MACT	T007									
7664-41-7	Ammonia as Nitrogen	0.17		mg/L	0.05	0.05	1	E350.1	11-Oct-17 08:45	13-Oct-17 10:40	M-CT007	7 405439A	
	acted analyses by method NA												
Analysis p	erformed by GZA Geoenvir	onmental, Inc	- Manchester,	CT* -									
	Aquatic Toxicity	See report	t	N/A			1	EPA 821-R-02-12	"	12-Oct-17		'[none]'	

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	03 -01				Project # Chelsea		Matrix Surface Wa		-Oct-17 09			ceived Oct-17	
CAS No.	Analyte(s)	Result	Flag	Units	*RDL	MDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert
Volatile O	rganic Compounds												
	organic Compounds by SW												
	by method SW846 5030 W												
71-43-2	Benzene	< 1.00		μg/l	1.00	0.28	1	SW846 8260C	12-Oct-17	13-Oct-17	GMA	1717339	
100-41-4	Ethylbenzene	< 1.00		μg/l	1.00	0.33	1	"	"	"	"	"	
634-04-4	Methyl tert-butyl ether	< 1.00		μg/l	1.00	0.24	1	"	"	"	"	"	
11-20-3	Naphthalene	< 1.00		μg/l	1.00	0.35	1	"	"	"	"	"	
08-88-3	Toluene	< 1.00		μg/l	1.00	0.30	1	"	"	"	"	"	
5-01-4	Vinyl chloride	< 1.00		μg/l	1.00	0.47	1	"	"	"	"	"	
79601-23-1	1 m,p-Xylene	< 2.00		μg/l	2.00	0.38	1	"	"	"	"	"	
5-47-6	o-Xylene	< 1.00		μg/l	1.00	0.28	1	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 10.0		μg/l	10.0	5.90	1	"	"	"	"	"	
34-17-5	Ethanol	< 200		μg/l	200	30.9	1	u	"	u u	"	"	
Surrogate	recoveries:												
160-00-4	4-Bromofluorobenzene	102			70-13	0 %		W.	"	"	"	"	
037-26-5	Toluene-d8	99			70-13	0 %		"	"	"	"	"	
7060-07-0	1,2-Dichloroethane-d4	111			70-13	0 %		"	"	"	"	"	
868-53-7	Dibromofluoromethane	104			70-13	0 %			"	"	"	"	
Semivolat	ile Organic Compounds by C	GCMS											
Re-analys	sis of Acid Extractables/Phe	enols											
repared	by method SW846 3510C												
08-95-2	Phenol	< 0.620	U	μg/l	4.81	0.620	1	SW846 8270D	17-Oct-17	24-Oct-17	MSL	1717901	
Surrogate	recoveries:												
67-12-4	2-Fluorophenol	13	SDUP		15-11	0 %		"	"	"		"	
	2-Fluorophenol Phenol-d5	13 10	SDUP SDUP		15-11 15-11			11	"	"	"	"	
165-62-2	•							"	"	"	"		
165-62-2 Re-analys	Phenol-d5		SDUP	μg/l			1	" " SW846 8270D SIM	" " 23-Oct-17		" " MSL		
165-62-2 Re-analys 3-32-9	Phenol-d5 sis of SVOCs by SIM	10	SDUP	hā\J	15-11	0 %	1		" " 23-Oct-17			"	
165-62-2 Re-analys 3-32-9 08-96-8	Phenol-d5 sis of SVOCs by SIM Acenaphthene	10 < 0.048	SDUP		<i>15-11</i> 0.048	0 %			23-Oct-17		MSL	"	
165-62-2 Re-analys 3-32-9 08-96-8 20-12-7	Phenol-d5 sis of SVOCs by SIM Acenaphthene Acenaphthylene	10 < 0.048 < 0.048	SDUP	μg/l	15-11 0.048 0.048	0 % 0.007 0.013	1		23-Oct-17 "		MSL "	"	
165-62-2 Re-analys 3-32-9 08-96-8 20-12-7 6-55-3	Phenol-d5 sis of SVOCs by SIM Acenaphthene Acenaphthylene Anthracene	10 < 0.048 < 0.048 < 0.048	SDUP	µg/l µg/l	15-11 0.048 0.048 0.048	0 % 0.007 0.013 0.007	1 1		23-Oct-17 "		MSL "	"	
165-62-2 Re-analys 3-32-9 08-96-8 20-12-7 6-55-3 0-32-8	Phenol-d5 Sis of SVOCs by SIM Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene	10 < 0.048 < 0.048 < 0.048 < 0.048	SDUP	µg/l µg/l µg/l	0.048 0.048 0.048 0.048	0 % 0.007 0.013 0.007 0.017	1 1 1		23-Oct-17 "		MSL " "		
165-62-2 Re-analys 3-32-9 08-96-8 20-12-7 6-55-3 0-32-8 05-99-2	Phenol-d5 sis of SVOCs by SIM Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (a) pyrene	10 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048	SDUP	hg/l hg/l hg/l	0.048 0.048 0.048 0.048 0.048	0.007 0.013 0.007 0.017 0.019	1 1 1		23-Oct-17 " "		MSL " "	" " " " " "	
165-62-2 Re-analys 3-32-9 08-96-8 20-12-7 6-55-3 0-32-8 05-99-2 91-24-2	Phenol-d5 sis of SVOCs by SIM Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b) fluoranthene	10 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048	SDUP	hā\I hā\I hā\I	0.048 0.048 0.048 0.048 0.048 0.048	0 % 0.007 0.013 0.007 0.017 0.019 0.020	1 1 1 1		23-Oct-17 " " " "		MSL " " "	n n n	
165-62-2 Re-analys 3-32-9 08-96-8 20-12-7 6-55-3 0-32-8 05-99-2 91-24-2 07-08-9	Phenol-d5 Sis of SVOCs by SIM Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b) fluoranthene Benzo (g,h,i) perylene	10 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048	SDUP	hā\I hā\I hā\I hā\I	0.048 0.048 0.048 0.048 0.048 0.048 0.048	0 % 0.007 0.013 0.007 0.017 0.019 0.020 0.018	1 1 1 1 1		" " " " " " " "		MSL " " "		
165-62-2 Re-analys 3-32-9 08-96-8 20-12-7 6-55-3 0-32-8 05-99-2 91-24-2 07-08-9 18-01-9	Phenol-d5 sis of SVOCs by SIM Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b) fluoranthene Benzo (g,h,i) perylene Benzo (k) fluoranthene	10 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048	SDUP	hā\I hā\I hā\I hā\I hā\I	0.048 0.048 0.048 0.048 0.048 0.048 0.048	0 % 0.007 0.013 0.007 0.017 0.019 0.020 0.018 0.018	1 1 1 1 1 1		23-Oct-17		MSL " " " " "		
165-62-2 Re-analys 3-32-9 08-96-8 20-12-7 6-55-3 0-32-8 05-99-2 91-24-2 07-08-9 18-01-9 3-70-3	Phenol-d5 sis of SVOCs by SIM Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b) fluoranthene Benzo (g,h,i) perylene Benzo (k) fluoranthene Chrysene	10 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048	SDUP	ha\/ ha\/ ha\/ ha\/ ha\/ ha\/	0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048	0 % 0.007 0.013 0.007 0.017 0.019 0.020 0.018 0.018 0.005	1 1 1 1 1 1 1		23-Oct-17		MSL " " " " " "		
165-62-2 Re-analys 3-32-9 08-96-8 20-12-7 6-55-3 0-32-8 05-99-2 91-24-2 07-08-9 18-01-9 3-70-3 06-44-0	Phenol-d5 sis of SVOCs by SIM Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b) fluoranthene Benzo (g,h,i) perylene Benzo (k) fluoranthene Chrysene Dibenzo (a,h) anthracene	10 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048	SDUP	ha\l ha\l ha\l ha\l ha\l ha\l	0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048	0 % 0.007 0.013 0.007 0.017 0.019 0.020 0.018 0.018 0.005 0.018	1 1 1 1 1 1 1 1		" " " " " " " " " " " "		MSL " " " " " "		
165-62-2 Re-analys 3-32-9 08-96-8 20-12-7 6-55-3 0-32-8 05-99-2 91-24-2 07-08-9 18-01-9 3-70-3 06-44-0 6-73-7	Phenol-d5 sis of SVOCs by SIM Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b) fluoranthene Benzo (g,h,i) perylene Benzo (k) fluoranthene Chrysene Dibenzo (a,h) anthracene Fluoranthene	10 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048	SDUP	ha\/ ha\/ ha\/ ha\/ ha\/ ha\/ ha\/	0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048	0 % 0.007 0.013 0.007 0.017 0.019 0.020 0.018 0.0018 0.005 0.018 0.004	1 1 1 1 1 1 1 1 1		23-Oct-17		MSL " " " " " "		
165-62-2 Re-analys 3-32-9 08-96-8 20-12-7 6-55-3 0-32-8 05-99-2 91-24-2 07-08-9 18-01-9 3-70-3 06-44-0 6-73-7 93-39-5	Phenol-d5 sis of SVOCs by SIM Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b) fluoranthene Benzo (g,h,i) perylene Benzo (k) fluoranthene Chrysene Dibenzo (a,h) anthracene Fluoranthene Fluorene	10 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048	SDUP	ha\/ ha\/ ha\/ ha\/ ha\/ ha\/ ha\/ ha\/	0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048	0 % 0.007 0.013 0.007 0.017 0.019 0.020 0.018 0.005 0.018 0.004 0.004	1 1 1 1 1 1 1 1 1		" " " " " " " " " " " "		MSL " " " " " "		
165-62-2 Re-analys 3-32-9 08-96-8 20-12-7 6-55-3 0-32-8 05-99-2 91-24-2 07-08-9 18-01-9 3-70-3 06-44-0 6-73-7 93-39-5 11-20-3	Phenol-d5 sis of SVOCs by SIM Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b) fluoranthene Benzo (g,h,i) perylene Benzo (k) fluoranthene Chrysene Dibenzo (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene	10 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048	SDUP	ha\/ ha\/ ha\/ ha\/ ha\/ ha\/ ha\/ ha\/	0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048	0 % 0.007 0.013 0.007 0.017 0.019 0.020 0.018 0.0018 0.005 0.018 0.004 0.012 0.021	1 1 1 1 1 1 1 1 1 1		" " " " " " " " " " " " "		MSL " " " " " " " " " "		
165-62-2 Re-analys 3-32-9 08-96-8 20-12-7 6-55-3 0-32-8 05-99-2 91-24-2 07-08-9 18-01-9 3-70-3 06-44-0 6-73-7 93-39-5 1-20-3 5-01-8	Phenol-d5 sis of SVOCs by SIM Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b) fluoranthene Benzo (b) fluoranthene Benzo (c) fluoranthene Benzo (d) anthracene Benzo (d) anthracene Benzo (d) fluoranthene Benzo (d) fluoranthene Chrysene Dibenzo (d) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene Phenanthrene	10 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048	SDUP	ha\/ ha\/ ha\/ ha\/ ha\/ ha\/ ha\/ ha\/	0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048	0 % 0.007 0.013 0.007 0.017 0.019 0.020 0.018 0.005 0.018 0.004 0.012 0.021 0.008	1 1 1 1 1 1 1 1 1 1 1 1		23-Oct-17 " " " " " " " " " " " "		MSL " " " " " " " " " "		
165-62-2 Re-analys 3-32-9 08-96-8 20-12-7 6-55-3 0-32-8 05-99-2 91-24-2 07-08-9 18-01-9 3-70-3 06-44-0 6-73-7 93-39-5 1-20-3 5-01-8 29-00-0	Phenol-d5 sis of SVOCs by SIM Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b) fluoranthene Benzo (c) fluoranthene Benzo (k) fluoranthene Chrysene Dibenzo (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene Phenanthrene Pyrene	10 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048	SDUP	ha\/ ha\/ ha\/ ha\/ ha\/ ha\/ ha\/ ha\/	0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048	0 % 0.007 0.013 0.007 0.017 0.019 0.020 0.018 0.0018 0.005 0.018 0.004 0.012 0.021	1 1 1 1 1 1 1 1 1 1 1			24-Oct-17	MSL		
165-62-2 Re-analys 3-32-9 08-96-8 20-12-7 6-55-3 0-32-8 05-99-2 91-24-2 07-08-9 18-01-9 3-70-3 06-44-0 6-73-7 93-39-5 1-20-3 5-01-8 29-00-0	Phenol-d5 sis of SVOCs by SIM Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b) fluoranthene Benzo (b) fluoranthene Benzo (c) fluoranthene Benzo (c) fluoranthene Benzo (c) fluoranthene Benzo (c) fluoranthene Chrysene Dibenzo (c) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene Phenanthrene Pyrene	10 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048	SDUP	ha\/ ha\/ ha\/ ha\/ ha\/ ha\/ ha\/ ha\/	0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048	0 % 0.007 0.013 0.007 0.017 0.019 0.020 0.018 0.005 0.018 0.004 0.012 0.021 0.021 0.008 0.006	1 1 1 1 1 1 1 1 1 1 1 1			24-Oct-17	MSL		
3-32-9 08-96-8 20-12-7 6-55-3 0-32-8 05-99-2 91-24-2 07-08-9 18-01-9 3-70-3 06-44-0 6-73-7 93-39-5 1-20-3 5-01-8 29-00-0	Phenol-d5 sis of SVOCs by SIM Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b) fluoranthene Benzo (c) fluoranthene Benzo (k) fluoranthene Chrysene Dibenzo (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene Phenanthrene Pyrene	10 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048 < 0.048	SDUP	ha\/ ha\/ ha\/ ha\/ ha\/ ha\/ ha\/ ha\/	0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048 0.048	0 % 0.007 0.013 0.007 0.017 0.019 0.020 0.018 0.005 0.018 0.004 0.012 0.021 0.021 0.008 0.006	1 1 1 1 1 1 1 1 1 1 1 1			24-Oct-17	MSL		

EPA-821-R-02-0

12

11-Oct-17 12-Oct-17

09:00

'[none]'

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N/A

Subcontracted analyses
Prepared by method NA

Aquatic Toxicity

Analysis performed by GZA Geoenvironmental, Inc. - Manchester, CT* -

See report

Volatile Organic Compounds - Quality Control

nalyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limi
W846 8260C										
atch 1717339 - SW846 5030 Water MS										
Blank (1717339-BLK1)					Pre	epared & Ai	nalyzed: 12-	Oct-17		
Benzene	< 1.0		μg/l	1.0						
Benzene	< 1.00		μg/l	1.00						
Ethylbenzene	< 1.0		μg/l	1.0						
Ethylbenzene	< 1.00		μg/l	1.00						
Methyl tert-butyl ether	< 1.00		μg/l	1.00						
Naphthalene	< 1.0		μg/l	1.0						
Naphthalene	< 1.00		μg/l	1.00						
Toluene	< 1.00		μg/l	1.00						
Toluene	< 1.0		μg/l	1.0						
m,p-Xylene	< 2.0		μg/l	2.0						
Vinyl chloride	< 1.00		μg/l	1.00						
o-Xylene	< 1.0		μg/l	1.0						
m,p-Xylene	< 2.00		μg/l	2.00						
o-Xylene	< 1.00		μg/l	1.00						
Tert-Butanol / butyl alcohol	< 10.0		μg/l	10.0						
Ethanol	< 200		μg/l	200						
Surrogate: 4-Bromofluorobenzene	49.5		μg/l		50.0		99	70-130		
Surrogate: 4-Bromofluorobenzene	49.5		μg/l		50.0		99	70-130		
Surrogate: Toluene-d8	50.0		μg/l		50.0		100	70-130		
Surrogate: Toluene-d8	50.0		μg/l		50.0		100	70-130		
Surrogate: 1,2-Dichloroethane-d4	55.0		μg/l		50.0		110	70-130		
Surrogate: 1,2-Dichloroethane-d4	55.0		μg/l		50.0		110	70-130		
Surrogate: Dibromofluoromethane	52.4		μg/l		50.0		105	70-130		
Surrogate: Dibromofluoromethane	52.4		μg/l		50.0		105	70-130		
LCS (1717339-BS1)					Pre	epared & A	nalyzed: 12-	Oct-17		
Benzene	22.5		μg/l		20.0		112	70-130		
Benzene	22.5		μg/l		20.0		112	70-130		
Ethylbenzene	22.6		μg/l		20.0		113	70-130		
Ethylbenzene	22.6		μg/l		20.0		113	70-130		
Methyl tert-butyl ether	25.9		μg/l		20.0		129	70-130		
Naphthalene	21.3		μg/l		20.0		107	70-130		
Naphthalene	21.3		μg/l		20.0		107	70-130		
Toluene	22.1		μg/l		20.0		111	70-130		
Toluene	22.1		μg/l		20.0		111	70-130		
m,p-Xylene	22.2		μg/l		20.0		111	70-130		
Vinyl chloride	23.8		μg/l		20.0		119	70-130		
o-Xylene	23.3		μg/l		20.0		117	70-130		
m,p-Xylene	22.2		μg/l		20.0		111	70-130		
o-Xylene	23.3		μg/l		20.0		117	70-130		
Tert-Butanol / butyl alcohol	234		μg/l		200		117	70-130		
Ethanol	424		μg/l		400		106	70-130		
Surrogate: 4-Bromofluorobenzene	50.4		μg/l		50.0		101	70-130		
Surrogate: 4-Bromofluorobenzene	50.4		μg/l		50.0		101	70-130		
Surrogate: Toluene-d8	50.4		μg/l		50.0		101	70-130		
Surrogate: Toluene-d8	50.4		μg/l		50.0		101	70-130 70-130		
Surrogate: 1,2-Dichloroethane-d4	55.0		μg/l		50.0		110	70-130 70-130		
Surrogate: 1,2-Dichloroethane-d4	55.0		μg/l		50.0		110	70-130 70-130		
Surrogate: Dibromofluoromethane	51.6		μg/l		50.0		103	70-130 70-130		
Surrogate: Dibromofluoromethane	51.6 51.6				50.0		103	70-130 70-130		
LCS Dup (1717339-BSD1)	37.0		μg/l				nalyzed: 12-			

Volatile Organic Compounds - Quality Control

analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPE Limi
SW846 8260C										
Batch 1717339 - SW846 5030 Water MS										
LCS Dup (1717339-BSD1)					Pre	epared & Ar	nalyzed: 12-	Oct-17		
Benzene	20.7		μg/l		20.0		103	70-130	8	20
Benzene	20.7		μg/l		20.0		103	70-130	8	20
Ethylbenzene	21.0		μg/l		20.0		105	70-130	7	20
Ethylbenzene	21.0		μg/l		20.0		105	70-130	7	20
Methyl tert-butyl ether	24.0		μg/l		20.0		120	70-130	7	20
Naphthalene	19.1		μg/l		20.0		96	70-130	11	20
Naphthalene	19.1		μg/l		20.0		96	70-130	11	20
Toluene	20.2		μg/l		20.0		101	70-130	9	20
Toluene	20.2		μg/l		20.0		101	70-130	9	20
Vinyl chloride	23.2		μg/l		20.0		116	70-130	2	20
m,p-Xylene	20.2		μg/l		20.0		101	70-130	9	20
m,p-Xylene	20.2		μg/l		20.0		101	70-130	9	20
o-Xylene	21.6		μg/l		20.0		108	70-130	8	20
o-Xylene	21.6		μg/l		20.0		108	70-130	8	20
Tert-Butanol / butyl alcohol	236		μg/l		200		118	70-130	1	20
Ethanol	436		μg/l		400		109	70-130	3	20
Surrogate: 4-Bromofluorobenzene	50.2		μg/l		50.0		100	70-130		
Surrogate: 4-Bromofluorobenzene	50.2		μg/l		50.0		100	70-130		
Surrogate: Toluene-d8	49.3		μg/l		50.0		99	70-130		
Surrogate: Toluene-d8	49.3		μg/l		50.0		99	70-130		
Surrogate: 1,2-Dichloroethane-d4	55.2		μg/l		50.0		110	70-130		
Surrogate: 1,2-Dichloroethane-d4	55.2		μg/l		50.0		110	70-130		
Surrogate: Dibromofluoromethane	51.2		μg/l		50.0		102	70-130		
Surrogate: Dibromofluoromethane	51.2		μg/l		50.0		102	70-130		

analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPI Lim
W846 8270D										
Satch 1717566 - SW846 3510C										
Blank (1717566-BLK1)					Pre	epared: 17-	Oct-17 Ana	alyzed: 19-O	ct-17	
4-Chloro-3-methylphenol	< 0.506	U	μg/l	0.506						
2-Chlorophenol	< 0.756	U	μg/l	0.756						
2,4-Dichlorophenol	< 0.535	U	μg/l	0.535						
2,4-Dimethylphenol	< 0.660	U	μg/l	0.660						
4,6-Dinitro-2-methylphenol	< 0.322	U	μg/l	0.322						
2,4-Dinitrophenol	< 0.567	U	μg/l	0.567						
2-Methylphenol	< 0.672	U	μg/l	0.672						
3 & 4-Methylphenol	< 0.621	U	μg/l	0.621						
2-Nitrophenol	< 0.470	U	μg/l	0.470						
4-Nitrophenol	< 0.846	U	μg/l	0.846						
Pentachlorophenol	< 0.377	U	μg/l	0.377						
Phenol	< 0.652	U	μg/l	0.652						
2,4,5-Trichlorophenol	< 0.525	U	μg/l	0.525						
2,4,6-Trichlorophenol	< 0.523	U	μg/l	0.523						
Surrogate: 2-Fluorophenol	29.1		μg/l		50.5		58	15-110		
Surrogate: Phenol-d5	23.7		μg/l		50.5		47	15-110		
LCS (1717566-BS1)					Pre	epared: 17-	Oct-17 Ana	alyzed: 19-0	ct-17	
4-Chloro-3-methylphenol	27.6		μg/l	0.506	50.5	•	55	30-130	<u></u>	
2-Chlorophenol	26.3		μg/l	0.756	50.5		52	30-130		
2,4-Dichlorophenol	28.1		μg/l	0.535	50.5		56	30-130		
2,4-Dimethylphenol	28.9		μg/l	0.660	50.5		57	30-130		
4,6-Dinitro-2-methylphenol	24.1		μg/l	0.322	50.5		48	30-130		
2,4-Dinitrophenol	21.2		μg/l	0.567	50.5		42	30-130		
2-Methylphenol	27.1		μg/l	0.672	50.5		54	30-130		
3 & 4-Methylphenol	26.6		μg/l	0.621	50.5		53	30-130		
2-Nitrophenol	30.7		μg/l	0.470	50.5		61	30-130		
4-Nitrophenol	24.8		μg/l	0.846	50.5		49	30-130		
Pentachlorophenol	30.5		μg/l	0.377	50.5		60	30-130		
Phenol	18.4		μg/l	0.652	50.5		36	30-130		
2.4.5-Trichlorophenol	30.1		μg/l	0.525	50.5		60	30-130		
2,4,6-Trichlorophenol	31.5		μg/l	0.523	50.5		62	30-130		
				0.020						
Surrogate: 2-Fluorophenol	19.6		μg/l		50.5		39	15-110		
Surrogate: Phenol-d5	16.5		μg/l		50.5		33	15-110		
LCS Dup (1717566-BSD1)						epared: 17-		alyzed: 19-O		
4-Chloro-3-methylphenol	29.2		μg/l	0.506	50.5		58	30-130	6	20
2-Chlorophenol	25.4		μg/l	0.756	50.5		50	30-130	3	20
2,4-Dichlorophenol	27.6		μg/l	0.535	50.5		55	30-130	2	20
2,4-Dimethylphenol	25.2		μg/l	0.660	50.5		50	30-130	14	20
4,6-Dinitro-2-methylphenol	28.0		μg/l	0.322	50.5		55	30-130	15	20
2,4-Dinitrophenol	20.7		μg/l	0.567	50.5		41	30-130	2	20
2-Methylphenol	24.6		μg/l	0.672	50.5		49	30-130	9	20
3 & 4-Methylphenol	24.7		μg/l	0.621	50.5		49	30-130	7	20
2-Nitrophenol	27.8		μg/l	0.470	50.5		55	30-130	10	20
4-Nitrophenol	22.8		μg/l	0.846	50.5		45	30-130	8	20
Pentachlorophenol	28.7		μg/l	0.377	50.5		57	30-130	6	20
Phenol	17.4		μg/l	0.652	50.5		34	30-130	5	20
2,4,5-Trichlorophenol	30.5		μg/l	0.525	50.5		60	30-130	2	20
2,4,6-Trichlorophenol	28.5		μg/l	0.523	50.5		56	30-130	10	20

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SW846 8270D										
Batch 1717566 - SW846 3510C										
LCS Dup (1717566-BSD1)					Pre	epared: 17-0	Oct-17 An	alyzed: 19-O	ct-17	
Surrogate: Phenol-d5	15.8		μg/l		50.5		31	15-110		
Batch 1717901 - SW846 3510C										
Blank (1717901-BLK1)					Pre	enared: 23-0	Oct-17 An	alyzed: 24-O	ct-17	
4-Chloro-3-methylphenol	< 0.506	U	μg/l	0.506		, pa. 54. 25		a., 200. 2 . 0	<u> </u>	
2-Chlorophenol	< 0.756	U	μg/l	0.756						
2,4-Dichlorophenol	< 0.535	U	μg/l	0.535						
2,4-Dimethylphenol	< 0.660	U	μg/l	0.660						
4,6-Dinitro-2-methylphenol	< 0.322	U	μg/l	0.322						
2,4-Dinitrophenol	< 0.567	U	μg/l	0.567						
2-Methylphenol	< 0.672	U	μg/l	0.672						
3 & 4-Methylphenol	< 0.621	U	μg/l	0.621						
2-Nitrophenol	< 0.470	U	μg/l	0.470						
4-Nitrophenol	< 0.846	U	μg/l	0.846						
Pentachlorophenol	< 0.377	U	μg/l	0.377						
Phenol	< 0.652	U	μg/l	0.652						
2,4,5-Trichlorophenol	< 0.525	U	μg/l	0.525						
2,4,6-Trichlorophenol	< 0.523	U	μg/l	0.523						
Surrogate: 2-Fluorophenol	19.7		μg/l		50.5		39	15-110		
Surrogate: Phenol-d5	17.5		μg/l		50.5		35	15-110		
LCS (1717901-BS1)			F-5··			nared: 23-0		alyzed: 24-O	ct_17	
4-Chloro-3-methylphenol	34.6		μg/l	0.491	49.0	parca. Zo v	71	30-130	<u> </u>	
2-Chlorophenol	30.6		μg/l	0.733	49.0		62	30-130		
2,4-Dichlorophenol	33.5		μg/l	0.520	49.0		68	30-130		
2,4-Dimethylphenol	29.1		μg/l	0.640	49.0		59	30-130		
4,6-Dinitro-2-methylphenol	36.7		μg/l	0.313	49.0		75	30-130		
2,4-Dinitrophenol	33.6		μg/l	0.550	49.0		69	30-130		
2-Methylphenol	31.0		μg/l	0.652	49.0		63	30-130		
3 & 4-Methylphenol	30.7		μg/l	0.603	49.0		63	30-130		
2-Nitrophenol	34.2		μg/l	0.456	49.0		70	30-130		
4-Nitrophenol	34.0		μg/l	0.822	49.0		69	30-130		
Pentachlorophenol	32.7		μg/l	0.366	49.0		67	30-130		
Phenol	25.9		μg/l	0.632	49.0		53	30-130		
2,4,5-Trichlorophenol	34.5		μg/l	0.510	49.0		70	30-130		
2,4,6-Trichlorophenol	33.9		μg/l	0.508	49.0		69	30-130		
Surrogate: 2-Fluorophenol	37.5		μg/l		49.0		76	15-110		
Surrogate: Phenol-d5	35.4		μg/l		49.0		70 72	15-110 15-110		
-	30.4		μул			narod: 22 (alvzed: 24-O	ot 17	
LCS Dup (1717901-BSD1) 4-Chloro-3-methylphenol	33.9		ua/l	0.501	50.0	epareu. 23-u	68	30-130	2	20
2-Chlorophenol	30.4		μg/l μg/l	0.501	50.0		61	30-130	0.6	20
2,4-Dichlorophenol	30.4 31.9			0.748	50.0		64	30-130	5	20
2,4-Dimethylphenol	28.3		μg/l μg/l	0.653	50.0		57	30-130	3	20
4,6-Dinitro-2-methylphenol	28.8 38.8		μg/l	0.033	50.0		78	30-130	5	20
2,4-Dinitrophenol	33.0		μg/l	0.519	50.0		66	30-130	2	20
2-Methylphenol	29.0		μg/l	0.665	50.0		58	30-130	7	20
3 & 4-Methylphenol	29.6		μg/l	0.615	50.0		59	30-130	3	20
2-Nitrophenol	33.7		μg/l	0.465	50.0		67	30-130	1	20
4-Nitrophenol	32.7		μg/l	0.403	50.0		65	30-130	4	20
Pentachlorophenol	34.3		μg/l	0.373	50.0		69	30-130	5	20
Phenol	25.8		μg/l	0.645	50.0		52	30-130	0.5	20

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPE Limi
SW846 8270D										
Batch 1717901 - SW846 3510C										
LCS Dup (1717901-BSD1)					Pre	epared: 23-	Oct-17 An	alyzed: 24-O	ct-17	
2,4,5-Trichlorophenol	35.1		μg/l	0.520	50.0		70	30-130	2	20
2,4,6-Trichlorophenol	32.7		μg/l	0.518	50.0		65	30-130	3	20
Surrogate: 2-Fluorophenol	36.5		μg/l		50.0		73	15-110		
Surrogate: Phenol-d5	34.8		μg/l		50.0		70	15-110		
SW846 8270D SIM										
Batch 1717566 - SW846 3510C										
Blank (1717566-BLK2)					Dra	nared: 17	Oct-17 An	alyzed: 18-O	ct_17	
Acenaphthene	< 0.051		μg/l	0.051	110	spareu. 17-	OCE IT AII	aiyzea. 10-0	<u> </u>	
Acenaphthylene	< 0.051		μg/l	0.051						
Anthracene	< 0.051		μg/l	0.051						
Benzo (a) anthracene	< 0.051		μg/l	0.051						
Benzo (a) pyrene	< 0.051		μg/l	0.051						
Benzo (b) fluoranthene	< 0.051		μg/l	0.051						
Benzo (g,h,i) perylene	< 0.051		μg/l	0.051						
Benzo (k) fluoranthene	< 0.051		μg/l	0.051						
Chrysene	< 0.051		μg/l	0.051						
Dibenzo (a,h) anthracene	< 0.051		μg/l	0.051						
Fluoranthene	< 0.051		μg/l	0.051						
Fluorene	< 0.051		μg/l	0.051						
Indeno (1,2,3-cd) pyrene	< 0.051		μg/l	0.051						
Naphthalene	< 0.051		μg/l	0.051						
Phenanthrene	< 0.051		μg/l	0.051						
Pyrene	< 0.051		μg/l	0.051						
Surrogate: Benzo (e) pyrene-d12	0.869		μg/l		1.01		86	30-130		
LCS (1717566-BS2)					Pre	epared: 17-	Oct-17 An	alyzed: 18-O	ct-17	
Acenaphthene	0.918		μg/l	0.051	1.02		90	40-140		
Acenaphthylene	0.828		μg/l	0.051	1.02		81	40-140		
Anthracene	0.767		μg/l	0.051	1.02		75	40-140		
Benzo (a) anthracene	0.921		μg/l	0.051	1.02		90	40-140		
Benzo (a) pyrene	0.961		μg/l	0.051	1.02		94	40-140		
Benzo (b) fluoranthene	0.931		μg/l	0.051	1.02		91	40-140		
Benzo (g,h,i) perylene	0.753		μg/l	0.051	1.02		74	40-140		
Benzo (k) fluoranthene	0.821		μg/l	0.051	1.02		81	40-140		
Chrysene	0.913		μg/l	0.051	1.02		90	40-140		
Dibenzo (a,h) anthracene	0.849		μg/l	0.051	1.02		83	40-140		
Fluoranthene	0.833		μg/l	0.051	1.02		82	40-140		
Fluorene	0.816		μg/l	0.051	1.02		80	40-140		
Indeno (1,2,3-cd) pyrene	0.782		μg/l	0.051	1.02		77	40-140		
Naphthalene	0.759		μg/l	0.051	1.02		74	40-140		
Phenanthrene	1.01		μg/l	0.051	1.02		99	40-140		
Pyrene	0.902		μg/l	0.051	1.02		88	40-140		
Surrogate: Benzo (e) pyrene-d12	0.714		μg/l		1.02		70	30-130		
LCS Dup (1717566-BSD2)					Pre	epared: 17-	Oct-17 An	alyzed: 18-O	ct-17	
Acenaphthene	0.836		μg/l	0.051	1.01		83	40-140	9	20
Acenaphthylene	0.693		μg/l	0.051	1.01		69	40-140	18	20
Anthracene	0.813		μg/l	0.051	1.01		80	40-140	6	20
Benzo (a) anthracene	0.948		μg/l	0.051	1.01		94	40-140	3	20
Benzo (a) pyrene	0.995		μg/l	0.051	1.01		99	40-140	3	20
Benzo (b) fluoranthene	0.942		μg/l	0.051	1.01		93	40-140	1	20

	_				Spike	Source	0.4	%REC		RPL
Analyte(s)	Result	Flag	Units	*RDL	Level	Result	%REC	Limits	RPD	Limi
SW846 8270D SIM										
Batch 1717566 - SW846 3510C										
LCS Dup (1717566-BSD2)					Pre	epared: 17-	Oct-17 Ana	alyzed: 18-O	ct-17	
Benzo (g,h,i) perylene	0.785		μg/l	0.051	1.01		78	40-140	4	20
Benzo (k) fluoranthene	0.866		μg/l	0.051	1.01		86	40-140	5	20
Chrysene	0.905		μg/l	0.051	1.01		90	40-140	0.9	20
Dibenzo (a,h) anthracene	0.892		μg/l	0.051	1.01		88	40-140	5	20
Fluoranthene	0.861		μg/l	0.051	1.01		85	40-140	3	20
Fluorene	0.775		μg/l	0.051	1.01		77	40-140	5	20
Indeno (1,2,3-cd) pyrene	0.841		μg/l	0.051	1.01		83	40-140	7	20
Naphthalene	0.722		μg/l	0.051	1.01		72	40-140	5	20
Phenanthrene	1.09		μg/l	0.051	1.01		108	40-140	8	20
Pyrene	0.909		μg/l	0.051	1.01		90	40-140	0.8	20
Surrogate: Benzo (e) pyrene-d12	0.848		μg/l		1.01		84	30-130		
Batch 1717901 - SW846 3510C										
Blank (1717901-BLK2)					Pre	epared: 23-	Oct-17 An	alyzed: 24-O	ct-17	
Acenaphthene	< 0.051		μg/l	0.051						
Acenaphthylene	< 0.051		μg/l	0.051						
Anthracene	< 0.051		μg/l	0.051						
Benzo (a) anthracene	< 0.051		μg/l	0.051						
Benzo (a) pyrene	< 0.051		μg/l	0.051						
Benzo (b) fluoranthene	< 0.051		μg/l	0.051						
Benzo (g,h,i) perylene	< 0.051		μg/l	0.051						
Benzo (k) fluoranthene	< 0.051		μg/l	0.051						
Chrysene	< 0.051		μg/l	0.051						
Dibenzo (a,h) anthracene	< 0.051		μg/l	0.051						
Fluoranthene	< 0.051		μg/l	0.051						
Fluorene	< 0.051		μg/l	0.051						
Indeno (1,2,3-cd) pyrene	< 0.051		μg/l	0.051						
Naphthalene	< 0.051		μg/l	0.051						
Phenanthrene	< 0.051		μg/l	0.051						
Pyrene	< 0.051		μg/l	0.051						
Surrogate: Benzo (e) pyrene-d12	0.879		μg/l		1.01		87	30-130		
LCS (1717901-BS2)						epared: 23-		alyzed: 24-O	ct-17	
Acenaphthene	0.585		μg/l	0.051	1.01		58	40-140		
Acenaphthylene	0.620		μg/l	0.051	1.01		61	40-140		
Anthracene	0.639		μg/l	0.051	1.01		63	40-140		
Benzo (a) anthracene	0.686		μg/l	0.051	1.01		68	40-140		
Benzo (a) pyrene	0.791		μg/l	0.051	1.01		78	40-140		
Benzo (b) fluoranthene	0.621		μg/l	0.051	1.01		62	40-140		
Benzo (g,h,i) perylene	0.614		μg/l	0.051	1.01		61	40-140		
Benzo (k) fluoranthene	0.649		μg/l	0.051	1.01		64	40-140		
Chrysene	0.662		μg/l	0.051	1.01		66	40-140		
Dibenzo (a,h) anthracene	0.638		μg/l	0.051	1.01		63	40-140		
Fluoranthene	0.638		μg/l	0.051	1.01		63	40-140		
Fluorene	0.640		μg/l	0.051	1.01		63	40-140		
Indeno (1,2,3-cd) pyrene	0.688		μg/l	0.051	1.01		68	40-140		
Naphthalene	0.549		μg/l	0.051	1.01		54	40-140		
Phenanthrene	0.714		μg/l	0.051	1.01		71	40-140		
Pyrene	0.682		μg/l	0.051	1.01		68	40-140		
Surrogate: Benzo (e) pyrene-d12	0.636		μg/l		1.01		63	30-130		
LCS Dup (1717901-BSD2)	0.030		μg/I					30-730 alyzed: 24-0		

nalyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
W846 8270D SIM										
atch 1717901 - SW846 3510C										
LCS Dup (1717901-BSD2)					Pre	epared: 23-	Oct-17 Ana	alyzed: 24-O	ct-17	
Acenaphthene	0.581		μg/l	0.050	1.00		58	40-140	0.7	20
Acenaphthylene	0.626		μg/l	0.050	1.00		63	40-140	0.9	20
Anthracene	0.599		μg/l	0.050	1.00		60	40-140	7	20
Benzo (a) anthracene	0.730		μg/l	0.050	1.00		73	40-140	6	20
Benzo (a) pyrene	0.782		μg/l	0.050	1.00		78	40-140	1	20
Benzo (b) fluoranthene	0.652		μg/l	0.050	1.00		65	40-140	5	20
Benzo (g,h,i) perylene	0.607		μg/l	0.050	1.00		61	40-140	1	20
Benzo (k) fluoranthene	0.672		μg/l	0.050	1.00		67	40-140	3	20
Chrysene	0.609		μg/l	0.050	1.00		61	40-140	8	20
Dibenzo (a,h) anthracene	0.677		μg/l	0.050	1.00		68	40-140	6	20
Fluoranthene	0.670		μg/l	0.050	1.00		67	40-140	5	20
Fluorene	0.684		μg/l	0.050	1.00		68	40-140	7	20
Indeno (1,2,3-cd) pyrene	0.667		μg/l	0.050	1.00		67	40-140	3	20
Naphthalene	0.572		μg/l	0.050	1.00		57	40-140	4	20
Phenanthrene	0.768		μg/l	0.050	1.00		77	40-140	7	20
Pyrene	0.707		μg/l	0.050	1.00		71	40-140	4	20
Surrogate: Benzo (e) pyrene-d12	0.600		μg/l		1.00		60	30-130		

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	SpikeSource%RECLevelResult%RECLimitsRPD	RPI Lim
ASTM D 1293-99B						
Batch 1717324 - General Preparation						
<u>Duplicate (1717324-DUP1)</u>			Source: SC4	10230-01	Prepared: 11-Oct-17 Analyzed: 19-Oct-17	
pH	7.94		pH Units		7.95 0.1	5
Reference (1717324-SRM1)					Prepared: 11-Oct-17 Analyzed: 19-Oct-17	
pН	5.99		pH Units		6.00 100 97.5-102. 5	
Reference (1717324-SRM2)					Prepared: 11-Oct-17 Analyzed: 19-Oct-17	
pH	6.00		pH Units		6.00 100 97.5-102.	
					5	
SM 2520 (01)						
Batch 1717670 - General Preparation					Processed 9 April 20 de 40 Oct 47	
Duplicate (1717670-DUP1)	26.1		Source: SC4		Prepared & Analyzed: 18-Oct-17 26.1 0	10
Salinity	26.1		ppt (1000)	1.00	Prepared & Analyzed: 18-Oct-17	10
Reference (1717670-SRM1) Salinity	10.1		ppt (1000)	1.00	Prepared & Analyzed: 18-Oct-17 10.0 101 90-110	
Reference (1717670-SRM2)	10.1		PP: (1000)	1.00	Prepared & Analyzed: 18-Oct-17	
Salinity	10.1		ppt (1000)	1.00	10.0 101 90-110	
SM2540 B (11)			,			
Batch 1717579 - General Preparation						
Blank (1717579-BLK1)					Prepared: 17-Oct-17 Analyzed: 18-Oct-17	
Total Solids	< 5.00		mg/l	5.00		
LCS (1717579-BS1)					Prepared: 17-Oct-17 Analyzed: 18-Oct-17	
Total Solids	1120		mg/l	10.0	1100 102 90-110	
SM2540D (11)						
Batch 1717578 - General Preparation						
Blank (1717578-BLK1)					Prepared: 17-Oct-17 Analyzed: 18-Oct-17	
Total Suspended Solids	< 0.5		mg/l	0.5		
LCS (1717578-BS1)					Prepared: 17-Oct-17 Analyzed: 18-Oct-17	
Total Suspended Solids	106		mg/l	10.0	100 106 90-110	
SM4500-Cl-G (11)						
Batch 1717498 - General Preparation						
Blank (1717498-BLK1)					Prepared & Analyzed: 14-Oct-17	
Total Residual Chlorine	< 0.020		mg/l	0.020		
LCS (1717498-BS1)					Prepared & Analyzed: 14-Oct-17	
Total Residual Chlorine	0.050		mg/l	0.020	0.0500 100 90-110	
<u>Duplicate (1717498-DUP1)</u> Total Residual Chlorine	0.017	J	Source: SC4	0.020	Prepared & Analyzed: 14-Oct-17 0.019 12	20
Matrix Spike (1717498-MS1)	0.017	J	Source: SC4		Prepared & Analyzed: 14-Oct-17	20
Total Residual Chlorine	0.062		mg/l	0.020	0.0500 0.019 85 80-120	
Matrix Spike Dup (1717498-MSD1)	5.302		Source: SC4		Prepared & Analyzed: 14-Oct-17	
Total Residual Chlorine	0.060		mg/l	0.020	0.0500 0.019 83 80-120 2	200
Reference (1717498-SRM1)					Prepared & Analyzed: 14-Oct-17	
Total Residual Chlorine	0.124		mg/l	0.020	0.131 95 85-115	
SM5310B (00, 11)						
Batch 1717748 - General Preparation						
Blank (1717748-BLK1)					Prepared & Analyzed: 19-Oct-17	
Total Organic Carbon	< 1.00		mg/l	1.00		
LCS (1717748-BS1)					Prepared & Analyzed: 19-Oct-17	
Total Organic Carbon	14.0		mg/l	1.00	15.0 94 85-115	

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
SM5310B (00, 11)										
Batch 1717748 - General Preparation										
Calibration Blank (1717748-CCB1)					Pro	epared & A	nalyzed: 19	-Oct-17		
Total Organic Carbon	0.125		mg/l							
Calibration Blank (1717748-CCB2)					Pro	epared & A	nalyzed: 19	-Oct-17		
Total Organic Carbon	0.216		mg/l							
Calibration Blank (1717748-CCB3)					Pro	epared & A	nalyzed: 19	-Oct-17		
Total Organic Carbon	0.128		mg/l							
Calibration Check (1717748-CCV1)					Pro	epared & A	nalyzed: 19	-Oct-17		
Total Organic Carbon	14.2		mg/l	1.00	15.0		95	85-115		
Calibration Check (1717748-CCV2)					Pro	epared & A	nalyzed: 19	-Oct-17		
Total Organic Carbon	14.4		mg/l	1.00	15.0		96	85-115		
Calibration Check (1717748-CCV3)					Pro	epared & A	nalyzed: 19	-Oct-17		
Total Organic Carbon	14.2		mg/l	1.00	15.0		94	85-115		
Reference (1717748-SRM1)					Pro	epared & A	nalyzed: 19	-Oct-17		
Total Organic Carbon	15.8		mg/l	1.00	14.6		109	88-112		

Metals Analyses (Total) - Quality Control

					Spike	Source		%REC		RPD
Analyte(s)	Result	Flag	Units	*RDL	Level	Result	%REC	Limits	RPD	Limit
EPA 200.8										
Batch B188766 - EPA 200.8										
Blank (B188766-BLK1)					Pre	epared: 17-	Oct-17 An	alyzed: 18-O	ct-17	
Zinc	< 20		μg/L	20				-		
Cadmium	< 0.20		μg/L	0.20				-		
Lead	< 0.50		μg/L	0.50				-		
Nickel	< 5.0		μg/L	5.0				-		
Copper	< 1.0		μg/L	1.0				-		
LCS (B188766-BS1)					Pre	epared: 17-	Oct-17 An	alyzed: 18-O	ct-17	
Cadmium	514		μg/L	2.0	500		103	85-115		
Copper	1040		μg/L	10	1000		104	85-115		
Lead	528		μg/L	5.0	500		106	85-115		
Nickel	524		μg/L	50	500		105	85-115		
Zinc	1040		μg/L	200	1000		104	85-115		
LCS Dup (B188766-BSD1)					Pre	epared: 17-	Oct-17 An	alyzed: 18-O	ct-17	
Cadmium	503		μg/L	2.0	500		101	85-115	2.09	20
Zinc	1010		μg/L	200	1000		101	85-115	3.02	20
Nickel	504		μg/L	50	500		101	85-115	3.84	20
Lead	518		μg/L	5.0	500		104	85-115	1.87	20
Copper	1010		μg/L	10	1000		101	85-115	3.23	20

Subcontracted Analyses - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<u>E350.1</u>										
Batch 405439A - 405439										
BLK (BZ19754-BLK)					Pre	epared & Ar	nalyzed: 13-	-Oct-17		
Ammonia as Nitrogen	< 0.05		mg/L	0.05				-		
DUP (BZ19754-DUP)			Source: BZ	<u> 19754</u>	Pre	epared & Ar	nalyzed: 13-	-Oct-17		
Ammonia as Nitrogen	0.27		mg/L	0.05				-	3.6	20
LCS (BZ19754-LCS)					Pre	epared & Ar	nalyzed: 13-	-Oct-17		
Ammonia as Nitrogen	3.610		mg/L	0.05	3.74		96.5	90-110		20
MS (BZ19754-MS)			Source: BZ	19754	Pre	epared & Ar	nalyzed: 13-	-Oct-17		
Ammonia as Nitrogen	2.050	m	mg/L	0.05	2		88.4	90-110		20

Subcontracted Analyses - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<u>E1664A</u>										
Batch 405870A - 405870										
BLK (BZ19769-BLK)					Pre	epared & A	nalyzed: 17	-Oct-17		
Oil and Grease by EPA 1664A	< 1.4		mg/L	1.4	40			-		
LCS (BZ19769-LCS)					Pre	epared: A	Analyzed: 17	-Oct-17		
Oil and Grease by EPA 1664A	39.60		mg/L	1.4	40		99	85-115		20
LCSD (BZ19769-LCSD)					Pre	epared: A	Analyzed: 17	-Oct-17		
Oil and Grease by EPA 1664A	39.30		%	1.4	40		98	85-115	1.0	20

Metals Analyses (Total) - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
EPA 200.8										
Batch B188766 - EPA 200.8										
Blank (B188766-BLK1)					Pre	epared: 17-	Oct-17 Ana	alyzed: 18-O	ct-17	
Chromium	0.74	J	μg/L	0.51				-		
LCS (B188766-BS1)					Pre	epared: 17-	Oct-17 Ana	alyzed: 18-O	ct-17	
Chromium	529		μg/L	5.1	500		106	85-115		
LCS Dup (B188766-BSD1)					Pre	epared: 17-	Oct-17 Ana	alyzed: 18-O	ct-17	
Chromium	510		μg/L	5.1	500		102	85-115	3.78	20

Notes and Definitions

LIV

DL-15 Sample required a dilution due to low internal standard recovery of the lesser diluted digestion, reporting limit is elevated. HT5 Sample was originally analyzed within the recommended method holding time; however, QC materials for the sample run were out of control. As a result, the sample was immediately re-analyzed (outside the holding time). Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J J-Flag). This parameter is outside laboratory ms/msd specified recovery limits. m Q1 Sample was received past hold time for Fecal Coliforms (SW9222D). **SDUP** Duplicate analysis confirmed surrogate failure due to matrix effects. U Analyte included in the analysis, but not detected at or above the MDL. dry Sample results reported on a dry weight basis NR Not Reported RPD Relative Percent Difference ClHT The method for residual chlorine indicates that samples should be analyzed immediately. 40 CFR 136 specifies a holding time of 15 minutes from sampling to analysis. Therefore all aqueous residual chlorine samples not analyzed in the field are considered out of hold time at the time of sample receipt. OG The required Matrix Spike and Matrix Spike Duplicate (MS/MSD) for Oil & Grease method 1664B can only be analyzed when the client has submitted sufficient sample volume. An extra liter per MS/MSD is required to fulfill the method OC criteria. Please refer to Chain of Custody and QC Summary (MS/MSD) of the Laboratory Report to verify ample sample volume was submitted to fulfill the requirement. The method for pH does not stipulate a specific holding time other than to state that the samples should be analyzed as рН soon as possible. For aqueous samples the 40 CFR 136 specifies a holding time of 15 minutes from sampling to analysis. Therefore all aqueous pH samples not analyzed in the field are considered out of hold time at the time of sample receipt. All soil samples are analyzed as soon as possible after sample receipt.

The initial volume for this sample has been reduced due to sample matrix and/or historical data therefore elevating the reporting limit.

This laboratory report is not valid without an authorized signature on the cover page.

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<u>Laboratory Control Sample (LCS)</u>: A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

<u>Matrix Spike</u>: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

<u>Method Blank</u>: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

<u>Method Detection Limit (MDL)</u>: The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

<u>Surrogate</u>: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

<u>Continuing Calibration Verification:</u> The calibration relationship established during the initial calibration must be verified at periodic intervals. Concentrations, intervals, and criteria are method specific.

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GEOTECHNICA

ENVIRONMENTAL

EGOLOGICAL

....

CONSTRUCTION

77 Batson Drive Manchester, CT 06042 T: 860.643.9560 F: 860.646.7169



ACUTE AQUATIC TOXICITY TEST REPORT

Gulf Oil Terminal Chelsea, MA

Test Start Date:	10/12/17
Test Period:	October 2017

Report Prepared by:

New England Bioassay
A Division of GZA GeoEnvironmental, Inc.
77 Batson Dr.
Manchester, CT 06042

NEB Project Number: 05.0045469.00

Report Date:	November 7, 2017	
		_

Report Submitted to:

Eurofins Spectrum Analytical, Inc. 11 Almgren Drive Agawam, MA 01001

This report shall not be reproduced, except in its entirety, without written approval of New England Bioassay (NEB).

NEB is the sole authority for authorizing edits or modifications to the data contained in this report. Test results relate only to samples analyzed. Please contact the Lab Manager, Kimberly Wills, at 860-858-3153 or kimberly.wills@gza.com if you have any questions concerning these results.

Whole Effluent Toxicity Testing Report Instruction Form

Test Date:

10/12/17

Client Name/Project: Spectrum / Gulf Oil Terminal

Sample ID: <u>SC40230-01/SC40225-01</u>
Your results were as follows:
Monitoring Only
□ Fail – Please proceed according to the instructions in your permit.
□ Invalid – Retesting is still required. Retest report will be sent at a later date under separate cover.
□ Original Test Invalid – Valid retest performed. Both test and retest results are attached.
□ Retesting will be or has been performed according to the Case 1 Protocols outlined in the attached copy of EPA-New England's species-specific, self-implementing policy for alternate dilution water.
This is your case of dilution water toxicity. Please proceed according to the Case 2 Protocols outlined in the attached copy of EPA-New England's species-specific, self-implementing policy for alternate dilution water. The alternate dilution water you select for future tests for this species should be described as follows: "synthetic laboratory water made up according to EPA's toxicity test protocols, by adding specified amounts of salts into deionized water in order to match the hardness of our receiving water." Writing this letter should help you to avoid retests in the future.
□ Available information is insufficient to determine whether this test passed or failed. Please compare results

Please complete the items on this list before reporting these results according to the instructions in the "Monitoring and Reporting" Section of your permit.

the status of future tests results and help ensure your compliance with permit requirements.

to your permit limits. Please submit a current copy of your permit to the NEB Lab so that we can determine

- Please complete, sign and date the upper portion of the "Whole Effluent Toxicity Test Report Certification" page which is the page directly following this page.
- Fill in the Sample Type and Sample Method (upper right) and the Permit Limits (lower left) on the New England Bioassay EPA Toxicity Test Summary Sheet(s) if they are incomplete.
- Fill in any missing information on the NEB Chain-of-Custody documents. This includes ensuring that the following information is recorded: Sampler's name and title, Facility name and address, Sample collection methods, Sample collection start and end dates and times, Types of sample, Chlorination status of samples upon shipment to NEB, Site description and Sample collection procedures.
- Monitoring results should be summarized on your monthly Discharge Monitoring Report Form.
- Signed and dated originals of this report must be submitted to the State (and Federal) Agencies specified in the "Monitoring and Reporting" section of your permit.

Questions? Please contact the Lab Manager, Kim Wills, at (860) 858-3153 or kimberly.wills@gza.com.

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION (Permittee)

I certify under penalty of law that this document and all ATTACHMENTS were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on	[Date]	[Authorized Signature]		
		[Print or Type Name and Title]		
		[Print or Type the Permittee's Name]		
		[Print or Type the NPDES Permit No.]		

Since the WET test and report check is complicated, the New England Bioassay Aquatic Toxicity Laboratory has certified the validity of the WET test data in the section below. Please note that this does not relieve the permittee from its responsibility to sign and certify the report under 40 C.F.R. S 122.41(k).

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION (Bioassay Laboratory)

I certify under penalty of law that this document and all ATTACHMENTS were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of time and imprisonment for knowing violations.

Executed on

[Authorized Signature]

Kim Wills, Laboratory Manager [Print or Type Name and Title]

New England Bioassay

[Print or Type Name of Bioassay Laboratory]

24. Telephone Contacts

If you have questions, please contact Joy Hilton, Water Technical Unit, at (617) 918-1877 or David McDonald, Ecosystem Assessment Unit, at (617) 918-8609.

NEW ENGLAND BIOASSAY, A DIVISION OF GZA EPA TEST SUMMARY SHEET

Facility Name: Gulf Oil Terminal		Test Start Date:	10/12/17
	r:MA0001091		
NPDES Permit Numbe Test Type X Acute Chronic Modified (Chronic reporting LC50 values) 24-Hour Screening Dilution Water X Receiving water col	r: MA0001091 Test Species Fathead Minnow Ceriodaphnia Dubia Daphnia Pulex X Mysid Shrimp Sheepshead Menidia Sea Urchin Selenastrum Other	Outfall Number:	Sample Method X Grab Composite Flow-thru Other
		on: Chelsea River	
_ Alternate Surface W	ater of known quality an	d a hardness to generally refle	ct the characteristics
Synthetic water prep	ared using either Millipo	ore Mill-Q or equivalent deion	zed water and
reagent grade chemic	als; or deionized water of	combined with mineral water;	
_	ixed with deionized water		
_Otner		_	
Effluent Sampling Date	e(s):10/11/17	=	
		25 12.5 25 50 100 monitoring only	
Was effluent salinity ac	ljusted? Yes If yes,	to what value? 25 ppt	
Reference Toxicant tes	t date: 10/2/17	Reference Toxicant Test Acce	eptable: Yes X No_
Age and Age Range of	Test Organisms 5 da	ys (< 24 hours) Source of Org	anisms <u>NEB</u>
		&PERMIT LIMITS	
	1 est Accept	tability Criteria	
A. Synthetic Water Con	ntrol		
Mean Control Survival		Mean Control Reproduction:	
Mean Control Weight:	N/A	Mean Control % Fertilization	n:N/A
B. Receiving Water Co Mean Control Survival	97.5%	Mean Control Reproduction:	
Mean Control Weight:	N/A	Mean Control % Fertilization	I. <u>IN/A</u>
C. Lab Culture Control	Yes_ No X		
D. Thiosulfate Control	Yes_ No X		
	Test V	ariability	
Test PMSD (growth) Test PMSD (reproducti	N/A on.) N/A		

Permit Limits & Test Results

	<u>Limits</u>		Results
LC50	N/A	LC50	>100%
		Upper Value	±∞
		Lower Value _	100%
		Data Analysis	
		Method Used	Graphical
A-NOEC	N/A	A-NOEC	100%
C-NOEC	N/A	C-NOEC	N/A
		LOEC	N/A
IC25	N/A	IC25	
IC50	N/A	IC50	

PMSD Comparison Discussion - N/A

Concentration-Response Evaluation

The concentration-response relationship observed in this data set corresponds to the following item number in Chapter Four of "Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)", EPA 821-B-00-004, July 2000:

- \underline{X} 1. Ideal concentration-response relationship
- _ 2. All or nothing response
- _ 3. Stimulatory response at low concentrations and detrimental effects at higher concentrations
- 4. Stimulation at low concentrations but no significant effect at higher concentrations
- 5. Interrupted concentration-response: significant effects bracketed by non-significant effects
- 6. Interrupted concentration-response: non-significant effects bracketed by significant effects
- 7. Significant effects only at highest concentration
- _ 8. Significant effects at all test concentrations but flat concentration-response curve
- 9. Significant effects at all test concentrations with a sloped concentration-response curve
- _ 10. Inverse concentration-response relationship

The concentration-response relationship was reviewed according to the above guidance document and the following determination was made:

- X 1. Results are reliable and should be reported.
- 2. Results are anomalous. An explanation is provided in the body of the report.
- _ 3. Results are inconclusive and the test should be repeated with a newly collected sample. An explanation is provided in the body of the report.

NEW ENGLAND BIOASSAY, A DIVISION OF GZA EPA TEST SUMMARY SHEET

Facility Name: Gulf Oil Terminal		Test Start Date:	10/12/17	
NPDES Permit Number: MA0001091		Outfall Number:		
Test Type X Acute Chronic Modified (Chronic reporting LC50 values) 24-Hour Screening	Test Species Fathead Minnow Ceriodaphnia Dubia Daphnia Pulex Mysid Shrimp Sheepshead X Menidia Sea Urchin	Sample Type Prechlorinated Dechlorinated Unchlorinated Chlorinated TRC conc. 0.067 mg	Sample Method X Grab Composite Flow-thru Other	
SelenastrumOther				
Effluent Sampling Date	e(s):10/11/17	≈ 0		
	s Tested (in%): 0 6 t Concentration): monit	25 12.5 25 50 100 toring only		
_	djusted? Yes If yes, t		ntakla. Van V. Na	
Reference Toxicant test date: $9/6/17$ Reference Toxicant Test Acceptable: Yes \underline{X} No_				
Age and Age Range of	Test Organisms 11 days	s (<24 hours) Source of Or	ganisms <u>AI</u>	
	10.000 00	&PERMIT LIMITS ability Criteria		
A. Synthetic Water Comment Control Survival Mean Control Weight:	:100%	Mean Control Reproduction: Mean Control % Fertilization		
B. Receiving Water Co Mean Control Survival Mean Control Weight:	:100%	Mean Control Reproduction: Mean Control % Fertilization		
C. Lab Culture Control	_			
D. Thiosulfate Control	1070	ariability		
Test PMSD (growth) Test PMSD (reproduct)	N/A ion.) N/A			

Permit Limits & Test Results

	Limits		Results
LC50	N/A	LC50	>100%
		Upper Value	±∞
		Lower Value	100%
		Data Analysis	
		Method Used	Graphical
A-NOEC	N/A	A-NOEC	100%
C-NOEC	N/A	C-NOEC	N/A
		LOEC _	N/A
IC25	N/A	IC25	
IC50	N/A	IC50	****

PMSD Comparison Discussion - N/A

Concentration-Response Evaluation

The concentration-response relationship observed in this data set corresponds to the following item number in Chapter Four of "Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)", EPA 821-B-00-004, July 2000:

Ideal concentration-response relationship
 All or nothing response
 Stimulatory response at low concentrations and detrimental effects at higher concentrations
 Stimulation at low concentrations but no significant effect at higher concentrations
 Interrupted concentration-response: significant effects bracketed by non-significant effects
 Interrupted concentration-response: non-significant effects bracketed by significant effects
 Significant effects only at highest concentration
 Significant effects at all test concentrations but flat concentration-response curve
 Significant effects at all test concentrations with a sloped concentration-response curve
 Inverse concentration-response relationship

The concentration-response relationship was reviewed according to the above guidance document and the following determination was made:

- \underline{X} 1. Results are reliable and should be reported.
- _ 2. Results are anomalous. An explanation is provided in the body of the report.
- 3. Results are inconclusive and the test should be repeated with a newly collected sample. An explanation is provided in the body of the report.

MYSIDOPSIS BAHIA AQUATIC TOXICITY TEST REPORT

Test Reference Manual: EPA 821-R-02-012, "Methods for Measuring the Acute Toxicity of

Effluents and Receiving Waters to Freshwater Organisms and

Marine Organisms", Fifth Edition

Test Method: Mysidopsis bahia Acute Toxicity Test – Method 2007.0

<u>Test Type</u>: Acute Static Non-Renewal Saltwater Test

Salinity: 25 ppt \pm 10% for all dilutions by dry ocean salts (Instant Ocean)

Temperature: 25 ± 1 °C

<u>Light Quality</u>: Ambient Laboratory Illumination

Photoperiod: 16 hours light, 8 hours dark

Test Chamber Size: 250 mL

Test Solution Volume: Minimum 200 mL

Age of Test Organisms: 5 days

Number of Mysids

Per Test Chamber: 10

Number of Replicate Test
Chambers Per Treatment: 4

Total Number of Mysids

Per Test Concentration: 40

Feeding Regime: Light feeding using concentrated *Artemia* nauplii while holding

prior to initiating the test.

Aeration: Aerated at <100 bubbles/minute

Dilution Water: Chelsea River

Alternate Control Water: NEB Artificial Salt Water (salinity 25 ppt)

Effluent Concentrations: 0%, 6.25%, 12.5%, 25%, 50% and 100% effluent

Test Duration: 48 hours

Effect measured: Mortality – no movement of body appendages on gentle prodding.

<u>Test Acceptability:</u> $\geq 90\%$ survival of test organisms in control solution Yes \underline{X} No_

<u>Sampling Requirements:</u> Samples first used within 36 hours of collection Yes \underline{X} No

Sample Volume Required: Minimum 2 liters

Test Organism Source: New England Bioassay

Test Acceptability Criteria: Mean Alternate Water Control Survival = 97.5%

Mean Dilution Water Control Survival = 97.5%

Test Results:		<u>Limits</u>	Results	
	48-hour LC50 Upper Value Lower Value Data Analysis Method Use A-NOEC	N/A	$>100\%$ $\pm \infty$ 100% Graphical 100%	
Reference Toxicant Data:	Date: Toxicant: Dilution Water: Toxicant Source: Organism Source: 48-hour LC50: In Acceptable Range	Sodium NEB A New En New En	2/17 n Dodecyl Sulfate rtificial Salt Water ngland Bioassay ngland Bioassay 2 mg/L X No	
Dechlorination Procedures	: Chlorine is measured using	ng 4500 CL-C	G DPD Colorimetric Method.	
X Dechlorination was not rec	quired.			
Sample was dechlorinated by adding sodium thiosulfate to the sample prior to test initiation. Since dechlorination of the effluent was necessary, a thiosulfate control of diluent water spiked with sodium thiosulfate was also included in the test series. Chlorine was mg/L in a dechlorinated sample.				
Chlorine Measurement was elevated due to interference. Chlorine was mg/L in a filtered sample.				
Total Residual Chlorine wa	s re-measured following aer	ration, and wa	as found to be mg/L.	
Additional Notes or Other	Conditions Affecting the T	<u>rest</u> :		

MENIDIA BERYLLINA AQUATIC TOXICITY TEST REPORT

<u>Test Reference Manual</u>: EPA 821-R-02-012, "Methods for Measuring the Acute Toxicity of

Effluents and Receiving Waters to Freshwater Organisms and

Marine Organisms", Fifth Edition

<u>Test Method:</u> Menidia beryllina Acute Toxicity Test – Method 2006.0

<u>Test Type</u>: Acute Static Non-Renewal Saltwater Test

Salinity: 25 ppt \pm 2 ppt by adding dry ocean salts (Instant Ocean)

Temperature: 25 ± 1 °C

<u>Light Quality</u>: Ambient Laboratory Illumination

Photoperiod: 16 hours light, 8 hours dark

Test Chamber Size: 250 mL

<u>Test Solution Volume:</u> Minimum 200 mL/replicate

<u>Age of Test Organisms:</u> <u>11</u> days old (24 hour age range)

Number of Fish Per

Test Chamber: 10

Number of Replicate Test
Chambers Per Treatment: 4

Total Number of Organisms
Per Test Concentration: 40

Feeding Regime: Light feeding using concentrated *Artemia* nauplii while holding

prior to initiating the test.

Aeration: Aerated at <100 bubbles/minute

Dilution Water: Chelsea River

Alternate Control Water: NEB Artificial Salt Water (salinity 25 ppt)

Effluent Concentrations: 0%, 6.25%, 12.5%, 25%, 50% and 100% effluent

Test Duration: 48 hours

Effect measured: Mortality – no movement on gentle prodding.

<u>Test Acceptability:</u> $\geq 90\%$ survival of test organisms in control solution Yes X No_

Sampling Requirements: Samples first used within 36 hours of collection Yes \underline{X} No

Sample Volume Required: Minimum 2 liters

Test Organism Source: Aquatic Indicators

<u>Test Acceptability Criteria</u>: Mean Alternate Water Control Survival = <u>100%</u>

Mean Dilution Water Control Survival = 100%

Test Results:		<u>Limits</u>	Results
	48-hour LC50 Upper Value Lower Value Data Analysis Method Use A-NOEC	N/A	$>100\%$ $\pm \infty$ 100% Graphical 100%
Reference Toxicant Data:	Date: Toxicant: Dilution Water: Toxicant Source: Organism Source: 48-hour LC50: In Acceptable Range	Sodium NEB A New E Aquati	n Dodecyl Sulfate artificial Salt Water ngland Bioassay c Indicators mg/L X No
Dechlorination Procedures	: Chlorine is measured usin	ng 4500 CL-C	G DPD Colorimetric Method.
X Dechlorination was not red	quired.		
Sample was dechlorinated be Since dechlorination of the ewith sodium thiosulfate was dechlorinated sample.	ffluent was necessary, a thic	osulfate conti	rol of diluent water spiked
Chlorine Measurement was filtered sample.	elevated due to interference	e. Chlorine v	vas mg/L in a
Total Residual Chlorine wa	s re-measured following aer	ration, and w	as found to be mg/L.
Additional Notes or Other	Conditions Affecting the T	<u> [est</u> :	
			*
===			

NEW ENGLAND BIOASSAY ACUTE TOXICITY DATA FORM COVER SHEET FOR LC50 TESTS

CLIENT:	Eurofins Spec	trum Analytical		M.bahia TEST ID#_	17-1590a
ADDRESS:	11 Almį	gren Drive		M.beryllina TEST ID#	17-1590b
	Agawam,	MA 01001		COC#	C37-38762/73
SAMPLE TYPE:	Gulf Oil Term	ninal Outfall 003		PROJECT#	05.0045469.00
DILUTION WATER:	Chels	ea River			
Sample Date(s):	10/	11/17	Received On:	10/12/1	17
INVE	RTEBRATES			<u>VERTEBRATES</u>	
TEST SET	Γ UP (TECH INIT)	СВ		TEST SET UP (TECH INIT)	СВ
	TEST SPECIES	Mysidopsis bahia		TEST SPECIES	Menidia beryllina
	NEB LOT#	Mb17 (10-7)		NEB LOT#	Ss17 AI (10-10)
	AGE	5 days		AGE	11 days
TEST SOLUTIO	N VOLUME (mls)	200	TEST	SOLUTION VOLUME (mls)	700
NO. ORGANISMS PER		10		SMS PER TEST CHAMBER	10
NO. ORGANISMS PER CO	ONCENTRATION	40	NO. ORGANISM	AS PER CONCENTRATION	40
NO. ORGANISM	S PER CONTROL	40	NO. OF	RGANISMS PER CONTROL	40
		-		-	
,	DATE	TIME	r	DATE	TIME
TEST START:	10/12/17	1549	TEST START:	10/12/17	1512
TEST END:	10/14/17	1549	TEST END:	10/14/17	1555
LABORATORY CONTROL ARTIFICIAL SW:	L WATER: NEB BATCH#	CRIO37-039	Salinity (ppt)	Alkalinity (mg/L CaCO ₃₎	
ARTIFICIAL SW.	NED BATCH#[CKIO37-039	25	123	
RESULTS OF Mys	idopsis bahia <u>I</u>	C50 TEST	RESULTS OF	Menidia beryllina LC50	0 TEST
METHOD	LC50 (%)	95% Confidence Limits	METHOD	LC50 (%)	95% Confidence Limits
BINOMIAL/GRAPHICAL	>100%	100%±∞	BINOMIAL/GRAPHICAL	>100%	100%±∞
PROBIT			PROBIT	ì	
1					
SPEARMAN KARBER			SPEARMAN KARBER		
NOAEL	100%		NOAEL	100%	
NOEC: NO OBSERVAB	LE EFFECT CO	ONCENTRATION			
Comments:					
RÉVIEWD BY:	Added 287.		effluent to bring salinity to 2 er to make a 25ppt diluent.		r with 2L of DI

NEW ENGLAND BIOASSAY Toxicity Test Data Sheet

NEB Test #:	17-1590a	Test Organism:	My	sidopsis ba	hia
Project #:	05.0045469.00	Organism Age:		5	days
Facility Name:	Gulf Oil Terminal	Test Duration:	48	_(hours)	
Date Sampled:	10/11/17	Beginning Date:	10/12/17	_Time: _	1549
Date Received:	10/12/17	Dilution Water Sou	ırce:	Chelsea	River
Sample ID:	Outfall 003	Salinity:	25	n	pt

Effluent Conc. %		umber Survivin Irganisn	g		issolve Oxyger (mg/L)		Те	mperati (°C)	ure		pH (su)			Salinity (ppt)	,
Initials	СВ	PD	ко	СВ	PD	КО	СВ	PD	КО	СВ	PD	ко	СВ	PD	ко
Les average	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control A	10	10	10	7.3	6.5	6.9	24.8	24.6	24.4	8.0	8.0	7.9	25	25	28
Control B	10	10	10		6.0	5.7		25,1	25.1		8.0	7.9		25	26
Control C	10	10	10		5.8	5.3		25.2	25.2		8.0	7.8		25	26
Control D	10	10	9		5.6	5.1		25.2	25.1		8.0	7.8		25	26
Diluent A	10	10	10	7.3	5.6	5.2	24.9	25.2	25.1	7.8	7.8	7.7	25	25	26
Diluent B	10	10	10		5.6	5.0		25.3	25.1		7.8	7.6		25	26
Diluent C	10	9	9		5.7	4.6		25.1	25.2		7.8	7.6		25	26
Diluent D	10	10	10		6.0	4.6		25.1	25.1		7.8	7.6		25	26
6.25 A	10	10	10	7.3	6.1	5.1	24.8	24.9	25.1	7.8	7.8	7.6	25	25	27
6.25 B	10	10	10		6.1	4.6		25.0	25.1		7.8	7.6		25	26
6.25 C	10	10	10		5.8	4.2		25.2	25.2		17.8	7.5		25	26
6,25 D	10	10	10		5.9	3.8		24.9	25.2		7.8	7.5		25	26
12.5 A	10	10	10	7.3	5.9	4.0	24.8	25.0	25.2	7.8	7.8	7.6	25	25	26
12.5 B	10	10	10		6.0	4.1		24.8	25.2		7.9	7.6		25	27
12.5 C	10	10	10		5.7	4.2		25.1	25.1		7.8	7.6		25	26
12.5 D	10	10	10		6.0	4.0		24.6	25.1		7.9	7.6		25	27
25 A	10	10	10	7.3	5.9	5.3	24.8	25.0	25.4	7.8	7.9	7.6	26	26	26
25 B	10	10	10		5.7	4.1		25.2	25.4		7.8	7.6		26	26
25 C	10	9	9		5.8	3.9		24.8	25.4		7.9	7.6		26	27
25 D	10	10	10		5.9	4.0		24.8	25.2		7.9	7.6		26	26

LC50	Confidence Interval	A-NOEC	Computational Method
>100%	100%±∞	100%	Graphical

NEW ENGLAND BIOASSAY Toxicity Test Data Sheet

NEB Test #:	17-1590a	Test Organism;	<i>M</i> y	/sidopsis ba	hia
Project #:	05.0045469.00	Organism Age:		5	days
Facility Name:	Gulf Oil Terminal	Test Duration:	48	(hours)	
Date Sampled:	10/11/17	Beginning Date:	10/12/17	Time: _	1549
Date Received:	10/12/17	Dilution Water S	Source:	Chelsea	River
Sample ID:	Outfall 003	Salinity:	25	n	nt

Effluent Conc. %	9	umber o Survivin rganisn	g		issolve Oxyger (mg/L)	า	Те	mperate (°C)	ure	pH (su)			Salinity (ppt)		
Initials	СВ	PD	КО	СВ	PD	КО	СВ	PD	КО	СВ	PD	KO	СВ	PD	KO
T. DEE W	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
50 A	10	9	9	7.3	5.7	4.1	24.7	25.2	25.4	7.9	7.9	7.7	26	26	27
50 B	10	9	9		5.4	3.9		25.2	24.5		7.9	7.7		26	27
50 C	10	10	10	į	5.5	3.9		25.2	25.3		7.9	7.7		26	27
50 D	10	10	10		5.5	3.8		25.0	25.3		7.9	7.7		26	26
100 A	10	10	10	7.4	6.0	4.2	24.5	25.0	25.3	7.9	8.1	7.9	27	27	28
100 B	10	10	10		5.9	4.8		25.2	25.3	ì	8.0	8.0		27	28
100 C	10	10	10		5.6	5.3		25.1	25.2		8.0	7.9		27	28
100 D	10	9	9		5.7	4.8		24.8	25.3		8.0	7.9		27	28

LC50	Confidence Interval	A-NOEC	Computational Method
>100%	100%±∞	100%	Graphical

Report Date: Test Code: 07 Nov-17 08:21 (p 1 of 2) 17-1590a | 05-2084-3277

Mysidopsis 9	6-h Acute Surviv	al Test				ı	New Engla	nd Bioassay
Analysis ID: Analyzed:	17-4492-0876 07 Nov-17 8:21	Endpoint: Analysis:	48h Survival Rate Nonparametric-Control vs Treatments		IS Version		/1.9.2	
Batch ID:	19-4244-6459	Test Type:	Survival (48h)	Anal	yst:			
Start Date:	12 Oct-17 15:49	Protocol:	EPA/821/R-02-012 (2002)	Dilue	ent: Re	ceiving Wa	ter	
Ending Date:	14 Oct-17 15:49	Species:	Mysidopsis bahia	Brin	e:			
Duration:	48h	Source:	In-House Culture	Age:	5d			
Sample ID:	20-9766-6475	Code:	7D07D9AB	Clie	nt: Sp	ectrum Ana	lytical	
Sample Date:	11 Oct-17 09:00	Material:	Industrial Effluent	Proj	ect:			
Receipt Date:	12 Oct-17	Source:	Gulf Oil Terminal (MA0001091)					
Sample Age:	31h	Station:						
Data Transfoi	m	Alt Hyp		NOEL	LOEL	TOEL	TU	PMSD
Angular (Corre	ected)	C > T		100	> 100	n/a	1	7.43%

Steel Many	-One R	ank Sum Test							
Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(a:5%)
Dilution Wa	ter	6.25	20	10	1	6	Asymp	0.9516	Non-Significant Effect
		12.5	20	10	1	6	Asymp	0.9516	Non-Significant Effect
		25	18	10	2	6	Asymp	0.8333	Non-Significant Effect
		50	16	10	2	6	Asymp	0.6105	Non-Significant Effect
		100	18	10	2	6	Asymp	0.8333	Non-Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(a:5%)
Between	0.0188129	0.0037626	5	0.7846	0.5740	Non-Significant Effect
Error	0.0863178	0.0047954	18			
Total	0.105131		23			

Distributional Tests								
Attribute	Test	Test Stat	Critical	P-Value	Decision(a:1%)			
Variances	Levene Equality of Variance Test	5.933	4.248	0.0021	Unequal Variances			
Variances	Mod Levene Equality of Variance Test	1.133	4.248	0.3786	Equal Variances			
Distribution	Shapiro-Wilk W Normality Test	0.8239	0.884	7.4E-04	Non-Normal Distribution			

18h Survival Rate Summary													
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0	D	4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	0.00%		
6.25		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-2.56%		
12.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-2.56%		
25		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	0.00%		
50		4	0.9500	0.8581	1.0000	0.9500	0.9000	1.0000	0.0289	6.08%	2.56%		
100		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	0.00%		

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	1.371	1,242	1.501	1,412	1,249	1.412	0.04074	5.94%	0.00%
6.25		4	1.412	1.412	1,412	1.412	1.412	1.412	0	0.00%	-2.97%
12.5		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	-2.97%
25		4	1,371	1,242	1.501	1.412	1,249	1.412	0.04074	5.94%	0.00%
50		4	1.331	1.181	1.48	1.331	1.249	1.412	0.04705	7.07%	2.97%
100		4	1.371	1,242	1.501	1.412	1.249	1,412	0.04074	5.94%	0.00%

003-166-085-8 CETIS™ v1.9.2.4 Analyst:_____ QA:____

Report Date:

07 Nov-17 08:21 (p 2 of 2) 17-1590a | 05-2084-3277

Test Code:

New England Bioassay

Analysis ID:	
Analyzed:	

17-4492-0876 07 Nov-17 8:21

48h Survival Rate Endpoint: Analysis:

Nonparametric-Control vs Treatments

CETIS Version: CETISv1.9.2 Official Re

suits	Yes	

48h	Survival	Rate	Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	0.9000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	0.9000	1,0000
50		0.9000	0.9000	1.0000	1.0000
100		1.0000	1_0000	1.0000	0.9000

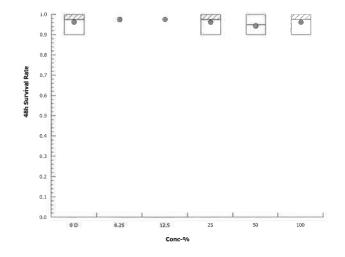
Angular (Corrected) Transformed Detail

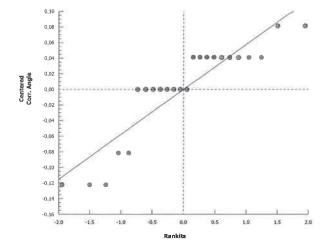
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.412	1.412	1.249	1.412
6.25		1.412	1.412	1.412	1.412
12.5		1.412	1.412	1.412	1.412
25		1.412	1.412	1.249	1.412
50		1.249	1.249	1.412	1.412
100		1.412	1.412	1.412	1.249

48h Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	9/10	10/10
6.25		10/10	10/10	10/10	10/10
12.5		10/10	10/10	10/10	10/10
25		10/10	10/10	9/10	10/10
50		9/10	9/10	10/10	10/10
100		10/10	10/10	10/10	9/10

Graphics





Report Date:

07 Nov-17 08:21 (p 1 of 2)

Test Code:

17-1590a | 05-2084-3277

							lest	Code:	17	7-1590a	05-2084-327
Mysidopsis 9	96-h Acute Surviv	al Test							Ne	ew Engla	and Bioassay
Analysis ID:	06-6342-3782	End	point:	48h Survival Ra	ate		CET	IS Version	: CETISv1	.9.2	
Analyzed:	07 Nov-17 8:21	Ana	lysis:	Linear Interpola	ation (ICPIN	l)	Offic	ial Results	s: Yes		
Batch ID:	19-4244-6459	Test	t Type:	Survival (48h)	2		Anal	yst:			
Start Date:	12 Oct-17 15:49	Prof	tocol:	EPA/821/R-02-	012 (2002)		Dilu	Diluent: Receiving Water			
Ending Date:	: 14 Oct-17 15:49		cies:	Mysidopsis bah	nia			e:			
Duration:	48h	Sou	rce:	In-House Cultu	ге		Age	: 5d			
Sample ID:	20-9766-6475	Cod	e:	7D07D9AB			Clie	nt: Sp	ectrum Analy	/tical	
Sample Date:	: 11 Oct-17 09:00	Mate	erial:	Industrial Efflue	ent		Proj	ect:			
Receipt Date	: 12 Oct-17	Sou	rce:	Gulf Oil Termin	Gulf Oil Terminal (MA0001091)						
Sample Age:	31h	Stat	ion:								
Linear Interp	olation Options										
X Transform	Y Transform			Resamples	Exp 95%						
Log(X)	Linear	4074	468	200	Yes	Two	-Point Interp	olation			
Point Estima	ites										
Level %	95% LCL	95% UCL	TU	95% LCL	95% UCL						
LC50 >100		n/a	<1	n/a	n/a						
	Rate Summary		_			ulated Varia					
Conc-%	Code	Count	Mean		Max	Std Err	Std Dev	CV%	%Effect	Α	В
0 6.25	D	4	0.975 1.000		1.0000 1.0000	0.0250 0.0000	0.0500 0.0000	5.13% 0.00%	0.0% -2.56%	39	40
12.5		4	1.000		1.0000	0.0000	0.0000	0.00%	-2.56% -2.56%	40 40	40 40
25		4	0.975		1.0000	0.0250	0.0500	5.13%	0.0%	39	40
50		4	0.950		1.0000	0.0289	0.0577	6.08%	2.56%	38	40
100		4	0,975	0.9000	1.0000	0.0250	0.0500	5.13%	0.0%	39	40
48h Survival	Rate Detail										
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4						
)	D	1.0000	1.000	0 0.9000	1.0000						
5.25		1.0000	1.000		1.0000						
12.5		1.0000	1.000		1.0000						
25		1.0000	1.000		1.0000						
50		0.9000	0.900		1.0000						
100		1.0000	1.000	0 1.0000	0.9000						
18h Survival	Rate Binomials										
Conc-%	Code	Rep 1	Rep 2		Rep 4						
)	D	10/10	10/10		10/10						
3.25		10/10	10/10		10/10						
12.5		10/10	10/10		10/10						
25 50		10/10	10/10		10/10						
50 100		9/10	9/10	10/10	10/10						
100		10/10	10/10	10/10	9/10						

Report Date:

07 Nov-17 08:21 (p 2 of 2)

Test Code:

17-1590a | 05-2084-3277

Mysidopsis 96-h Acute Survival Test

New England Bioassay

Analyzed:

Analysis ID: 06-6342-3782 07 Nov-17 8:21 Endpoint: 48h Survival Rate

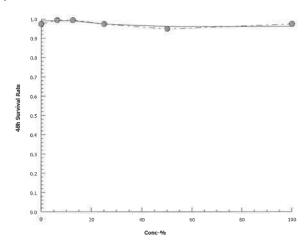
Linear Interpolation (ICPIN)

Analysis:

Official Results:

CETIS Version: CETISv1.9.2 Yes

Graphics



NEW ENGLAND BIOASSAY Toxicity Test Data Sheet

NEB Test #:	17-1590b	Test Organism:		Menidia beryllina			
Project #:	05.0045469.00	Organism Age:		11		days	
Facility Name:	Gulf Oil Terminal	Test Duration:	48	3(hours)		
Date Sampled:	10/11/17	Beginning Date:	10/12	2/177	Time:	1512	
Date Received:	10/12/17	Dilution Water S	Source:		Chelsea Ri	ver	
Sample ID:	Outfall 003	Salinitv:		25	ppt		

Effluent Conc. %		umber o Survivin Organism	g		issolve Oxyger (mg/L)		Те	mperati (°C)	ure		pH (su)			Salinity (ppt)	
Initials	СВ	PD	KO	СВ	PD	KO	СВ	PD	ко	СВ	PD	KO	СВ	PD	ко
	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control A	10	10	10	7.3	6.1	6.3	24.8	24.6	24.6	8.0	8.0	7.8	25	25	26
Control B	10	10	10		5.8	5.8		25.0	24.7		8.0	7.8		25	26
Control C	10	10	10		5.8	5.6		24.9	24.8		8.0	7.9		25	26
Control D	10	10	10		6.0	5.6		24.8	24.6		8.0	7.0		25	26
Diluent A	10	10	10	7.3	6.1	6.1	24.9	24.6	24.4	7.8	7.9	7.7	25	25	26
Diluent B	10	10	10		5.8	5.7		24.9	24.9		7.8	7.7		25	26
Diluent C	10	10	10		5.7	5.5		24.9	24.9		7.8	7.7		25	26
Diluent D	10	10	10		5.9	5.4		24.9	24.9		7.8	7.7		25	26
6.25 A	10	10	10	7.3	5.8	6.1	24.8	25.0	24.9	7.8	7.8	7.7	25	25	26
6.25 B	10	10	9		5.8	5.7		25.1	24.9		7.8	7.7		25	26
6.25 C	10	10	9		5.6	5.5		25.0	25.1		7.8	7.7		25	26
6.25 D	10	10	10		5.8	5.3		24.9	25.0		7.8	7.7		25	26
12.5 A	10	10	10	7.3	5.6	6.1	24.8	25.1	25.1	7.8	7.8	7.7	25	26	26
12.5 B	10	10	10		5.7	5.6		25.1	25.2		7.8	7.7		26	26
12.5 C	10	10	10		5.7	5.4		25.0	25.2		7.8	7.7		26	26
12.5 D	10	10	10		5.7	5.4		25.0	25.2		7.8	7.8		26	26
25 A	10	10	10	7.3	5.9	6.0	24.8	25.0	25.1	7.8	7.9	7.8	26	26	26
25 B	10	10	10		5.7	5.5		25.0	25.3		7.9	7.8		26	26
25 C	10	10	10		5.8	5.2		25.0	25.2		7.9	7.8		26	26
25 D	10	10	10		5.9	5.3		24.8	25.0		7.9	7.8		26	26

LC50	Confidence Interval	A-NOEC	Computational Method			
>100%	100%±∞	100%	Graphical			

NEW ENGLAND BIOASSAY Toxicity Test Data Sheet

NEB Test #:	17-1590b	Test Organism:	Menidia beryllina				
Project #:	05.0045469.00	Organism Age:		11			
Facility Name:	Gulf Oil Terminal	Test Duration:	48	_(hours)			
Date Sampled:	10/11/17	Beginning Date:	10/12/17	_Time: _	1512		
Date Received:	10/12/17	Dilution Water S	Source:	Chelsea	River		
Sample ID:	Outfall 003	Salinity:	25	р	ppt		

Effluent Conc. %	1	Number of Surviving Organisms			Dissolved Oxygen (mg/L)			Temperature (°C)			pH (su)		Salinity (ppt)		
Initials	СВ	PD	KO	СВ	PD	ко	СВ	PD	ко	СВ	PD	ко	СВ	PD	КО
	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
50 A	10	10	9	7.3	6.0	5.7	24.7	24.7	25.2	7.9	8.0	7.9	26	27	27
50 B	10	10	10	Ì	5.9	5.6		24.8	25.1		8.0	7.9		26	27
50 C	10	10	10		5.7	5.4		24.9	25.1		7.9	7.9		26	26
50 D	10	10	10		5.9	5.4		24.6	24.9		8.0	7.9		26	27
100 A	10	10	10	7.4	6.1	5.5	24.5	24.4	24.9	7.9	8.1	8.0	27	28	28
100 B	10	10	10		5.8	5.6		24.7	25.0		8.0	8.0		27	28
100 C	10	10	10		5.9	5.5		24.7	25.1		8.0	8.0		27	28
100 D	10	10	10		5.9	5.4		24.7	24.9		8.0	8.0		27	28

LC50	Confidence Interval	A-NOEC	Computational Method			
>100%	100%±∞	100%	Graphical			

100

Report Date: Test Code: 07 Nov-17 08:28 (p 1 of 2) 17-1590b | 15-2131-8602

0.00%

0.00%

										Test	t Code:	17	7-1590b 1	5-2131-860
Inland Silvers	ide 9	6-h Acute	Surviva	al Test								Ne	ew Englan	d Bioassa
Analysis ID:	02-9	233-5194		Endpoint:	48h	Survival R	ate			CET	'IS Version	: CETISv1	.9.2	
Analyzed:	07 N	Nov-17 8:28	8	Analysis:	Non	parametric	-Contro	i vs 1	Freatments	Offic	cial Result	s: Yes		
Batch ID:	12-26	653-6696		Test Type:	Sun	vival (48h)				Ana	lyst:			
Start Date:	12 O	ct-17 15:12	2	Protocol:		V821/R-02	-012 (20	002)		Dilu		ceiving Wate	er	
Ending Date:	14 0	ct-17 15:55	5	Species:	Mer	nidia beryllii	na			Brin	ie:			
Duration:	49h			Source:	e: Aquatic Indicators, CA						: 110	d		
Sample ID:	02-52	215-8514		Code:	F07	A232				Clie	nt: Sp	ectrum Analy	/tical	
Sample Date:	11 0	ct-17 09:00)	Material:	Indu	ustrial Efflue	ent			Proj	ect:			
Receipt Date:	12 O	ct-17	Source: Gulf Oil Terminal (MA0001091)											
Sample Age:	30h			Station:										
Data Transfor	m		Alt H	lyp						NOEL	LOEL	TOEL	TU	PMSD
Angular (Corre	cted)		C > T							100	> 100	n/a	1	5.90%
Steel Many-O	ne Ra	nk Sum To	est											
Control	vs	Conc-%		Test	Stat	Critical	Ties	DF	P-Type	P-Value	Decision	n(a:5%)		
Dilution Water		6.25 14				10	1	6	Asymp	0.3451	Non-Sigr	nificant Effect	t	
		12.5		18		10	1	6	Asymp	0.8333	Non-Sigr			
		25		18		10	1	6	Asymp	0.8333		nificant Effect		
		50		16		10	1	6	Asymp	0.6105	-	nificant Effect		
		100		18		10	1	6	Asymp	0.8333	Non-Sigr	nificant Effect	t	
ANOVA Table														
Source		Sum Squ	ares	Mean	Squ	are	DF		F Stat	P-Value	Decision	n(a:5%)		
Between		0.0232394	4	0.004	6479				1.8	0.1637	Non-Sigr	nificant Effect	t	
Error		0.0464788		0.002	5822									
Total ————————————————————————————————————		0.0697182	2				23							
Distributional	Tests	5												
Attribute		Test					Test	Stat	Critical	P-Value	Decision(α:1%)			
Variances				of Variance			20.2		4.248	8.2E-07	·			
Variances				ality of Varia		Test	4.2		4.248	0.0105	Equal Variances			
Distribution		Shapiro-W	Vilk VV N	Normality Te	st		0.772	!1 	0.884	1.1E-04	Non-Nor	mal Distributi	on	
48h Survival F	Rate S	Summary												
Conc-%		Code	Coun			95% LCL		_		Min	Max	Std Err	CV%	%Effec
)		D	4	1.000		1.0000	1.000		1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25			4	0.950		0.8581	1.000		0.9500	0.9000	1.0000	0.0289	6.08%	5.00%
12.5			4	1.000		1.0000	1.000		1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25			4	1.000		1.0000	1.000		1.0000	1,0000	1.0000	0.0000	0.00%	0.00%
50			4 4	0.975 1.000		0.8954 1.0000	1.000		1.0000 1.0000	0.9000 1.0000	1.0000 1.0000	0.0250 0.0000	5.13% 0.00%	2.50% 0.00%
100						1.0000	1.000		1.0000	1.0000	1.0000	0,0000	0,0076	0,0076
Angular (Corr	ected			_		0.50/ 1.07	6=01	101		B#: -		0445	(3) (0)	0/=66
Conc-%		Code	Coun	t Mean 1.412		95% LCL 1.412	95%		Median 1.412	Min	Max 1.412	Std Err	CV% 0.00%	%Effec
5.25		ט	4 4	1,412		1.412	1.412		1.412	1.412 1.249	1.412	0 0.04705	7.07%	0.00% 5.77%
			4	1.412		1.412	1,412		1.331	1.412	1.412	0.04705	0.00%	0.00%
12.5 25				1.412		1.412	1.412		1.412	1.412	1.412	0	0.00%	0.00%
zs 50			4 4	1.412		1.412	1.501		1.412	1.412	1.412	0.04074	5.94%	2.89%
100			4	1.371		1.272	1.001		1.412	1.249	1.412	0.04074	J. J4 70	2.0370

003-166-085-8 CETIS™ v1.9.2.4 Analyst:_____ QA:____

1.412

1.412

1.412 1.412

1.412

1.412

Report Date:

07 Nov-17 08:28 (p 2 of 2) 17-1590b | 15-2131-8602

Test Code:

New England Bioassay

02-9233-5194

48h Survival Rate	CETIS Version:	CETISv1.9.2

Analyzed:	07 Nov-17 8:28	Analysis:	Nonparametric-Control vs Treatments	Official Results: Yes
-----------	----------------	-----------	-------------------------------------	-----------------------

Endpoint:

48h Survival Rate Detail

Analysis ID:

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1,0000	1.0000
6.25		1.0000	0.9000	0.9000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		0.9000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000

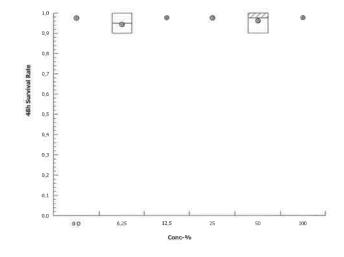
Angular (Corrected) Transformed Detail

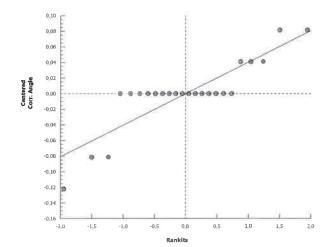
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.412	1.412	1.412	1.412
6.25		1.412	1.249	1.249	1.412
12.5		1.412	1.412	1.412	1.412
25		1.412	1.412	1.412	1.412
50		1.249	1.412	1.412	1.412
100		1.412	1.412	1,412	1.412

48h Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	10/10	10/10
6.25		10/10	9/10	9/10	10/10
12,5		10/10	10/10	10/10	10/10
25		10/10	10/10	10/10	10/10
50		9/10	10/10	10/10	10/10
100		10/10	10/10	10/10	10/10

Graphics





100

10/10

10/10

10/10

10/10

Report Date: Test Code: 07 Nov-17 08:28 (p 1 of 2) 17-1590b | 15-2131-8602

								Tes	t Code:		17	′-1590b	15-2131-8602
Inland Silvers	side 96-h Acute S	Survival Te	st								N	ew Engla	and Bioassay
Analysis ID:	14-8316-9267	16-9267 Endpoint:		idpoint: 48h Survival Rate							CETISv1	.9.2	
Analyzed:	07 Nov-17 8:28	Ana	lysis:	Linear Interpolation (ICPIN)					cial Res	ults:	Yes		
Batch ID:	12-2653-6696	Test	Type:	Survival (48h)	Ana	alyst:							
Start Date:	12 Oct-17 15:12		ocol:	EPA/821/R-02-		•	Recei	ving Wate	er				
Ending Date:	14 Oct-17 15:55	Spe	cies:	Menidia beryllin				Bri			•		
Duration:	49h	Sou	гсе:	Aquatic Indicate		Age	:	11d					
Sample ID:	02-5215-8514	Cod	e:	F07A232				Clie	ent:	Spect	rum Analy	rtical	
Sample Date:	: 11 Oct-17 09:00	Mate	erial:	Industrial Efflue	ent			Pro	ject:				
Receipt Date:	: 12 Oct-17	Sou	rce:	Gulf Oil Termin	al (MA000	1091)							
Sample Age:	30h	Stat	ion:										
Linear Interp	olation Options												
X Transform	Y Transform	See	d	Resamples	Exp 95%	% CL	Meth	nod					
Log(X)	Linear	4435	583	200	Yes		Two-	-Point Inter	polation				
Point Estimat	tes												
Level %	95% LCL	95% UCL	TU	95% LCL	95% UCI								
LC50 >100) n/a	n/a	<1	n/a	n/a								
48h Survival	Rate Summary				Calc	ulated	l Varia	te(A/B)					
Conc-%	Code	Count	Mean	Min	Max	Sto	l Err	Std Dev	CV%		%Effect	Α	В
0	D	4	1.000	0 1.0000	1.0000	0.0	000	0.0000	0.00%	ó	0.0%	40	40
6.25		4	0.950	0.9000	1.0000	0.0	289	0.0577	6.08%	0	5.0%	38	40
12.5		4	1.000	0 1.0000	1.0000	0.0	000	0.0000	0.00%	Ď	0.0%	40	40
25		4	1.000	0 1.0000	1.0000	0.0	000	0.0000	0.00%		0.0%	40	40
50		4	0.975	0.9000	1.0000		250	0.0500	5.13%		2.5%	39	40
100		4	1.000	0 1.0000	1.0000	0.0	000	0.0000	0.00%	ó	0.0%	40	40
48h Survival	Rate Detail												
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4								
0	D	1.0000	1.000	0 1.0000	1.0000								
6.25		1.0000	0.900	0.9000	1.0000								
12.5		1.0000	1.000	0 1.0000	1.0000								
25		1.0000	1.000	0 1.0000	1.0000								
50		0.9000	1.000	0 1.0000	1.0000								
100		1.0000	1.000	0 1.0000	1.0000								
48h Survival	Rate Binomials												
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4								
0	D	10/10	10/10	10/10	10/10								
6.25		10/10	9/10	9/10	10/10								
12.5		10/10	10/10	10/10	10/10								
25		10/10	10/10		10/10								
50		9/10	10/10		10/10								
		5/ 10	. 5/ 10	10/10	10, 10								

Report Date:

07 Nov-17 08:28 (p 2 of 2)

Test Code:

17-1590b | 15-2131-8602

Inland Silverside 96-h Acute Survival Test

New England Bioassay

Analysis ID: Analyzed: 14-8316-9267 07 Nov-17 8:28

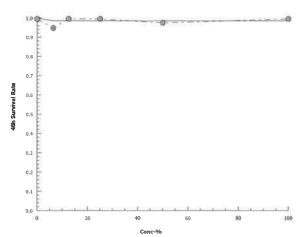
Endpoint: 48h Survival Rate

Analysis: Linear Interpolation (ICPIN)

CETIS Version: Official Results:

ersion: CETISv1.9.2 Results: Yes

Graphics



INITIAL CHEMISTRY INFORMATION

CLIENT: PROJECT # Gulf Oil Terminal - 003

05.0045469.00

RECIEPT DATE	Т	ВР
SAMPLE	Effluent	Receiving Water
COC#	C37-3872	C37-3873
Temperature (°C)	3.9	4.1
Dissolved Oxygen (mg/L)	7.1	7.6
pH (standard units)	6.9	6.9
Conductivity (µmhos/cm)	246	44,200
Salinity (ppt)	<1	28
Hardness (as mg/L CaCO3)	54	5000
Alkalinity (as mg/L CaCO3)	45	100
TRC - DPD (mg/L)	0.067*	0.014
INITIALS	TBP	TBP

Additional notes:

*TRC reading <0	0.05 mg/L whe	n measured by	amperometric	titration.



SUBCONTRACT ORDER

Spectrum Analytical

SC40230

SENDING LABORATORY:

Eurofins Spectrum Analytical, Inc.

11 Almgren Drive Agawam, MA 01001 Phone: (413) 789-9018 Fax: (413) 789-4076

Project Manager: Dulce Litchfield

Project: Gulf Terminal - Chelsea, MA

Project #:

Gulf Chelsea

PO Number:

77 Batson Drive

Manchester, CT 06042

Phone: (860) 286-8900

Fax: (860) 242-8389

RECEIVING LABORATORY:

SC40230

GZA Geoenvironmental, Inc. - Manchester, CT*

BILL TO:

Eurofins Spectrum Analytical, Inc.

2425 New Holland Pike Lancaster, PA 17601

Attention: Accounts Payable accountspayable@eurofinsus.com

PO Number: SC4

SC40230

Laboratory ID	Sample ID	Sampled	Matrix	Analysis	Due	Comments
	SC40230-01	11-Oct-17 09:00	Surface Water	Aquatic Tox	26-Oct-17 16:00	Client ID is Outfall 003/LC50
ntainers Supplied:						

Other (O)

C37-, 3072

ERF

Please send notice within 24 hours of obtaining valid data, of the results of all drinking water samples that exceed any EPA or Department-established maximum contaminant level, maximum residual disinfectant level or reportable concentration. Notice should be emailed to <u>SpectrumLabResults@EurofinsUS.com</u>.

Please notify <u>SpectrumLabResults@EurofinsUS.com</u> immediately and prior to conducting analysis if certification is not held for the analyses requested.

Please e-mail results in electronic format to SpectrumLabResults@EurofinsUS.com.

Received

ON ICE

Released By Date Date Received by Ban Proper 10/12/17
Date Temp °C

Released By

Date

Received By

Date



SUBCONTRACT ORDER

Spectrum Analytical

SC40225

SENDING LABORATORY:

Eurofins Spectrum Analytical, Inc.

11 Almgren Drive Agawam, MA 01001 Phone: (413) 789-9018 Fax: (413) 789-4076

Project Manager: Dulce Litchfield

Project: Gulf Terminal - Chelsea, MA

RECEIVING LABORATORY:

GZA Geoenvironmental, Inc. - Manchester, CT*

77 Batson Drive Manchester, CT 06042 Phone: (860) 286-8900 Fax: (860) 242-8389

Project #: Gulf Chelsea

PO Number: SC40225

BILL TO:

Eurofins Spectrum Analytical, Inc.

2425 New Holland Pike Lancaster, PA 17601 Attention: Accounts Payable

accountspayable@eurofinsus.com
PO Number: SC40225

Laboratory ID Sample ID Sampled Matrix Analysis Due Comments

SC40225-01 11-Oct-17 08:45 Surface Water Aquatic Tox 26-Oct-17 16:00 Client ID is Chelsea Creek/LC50

Containers Supplied:

Other (I)

C37-3873

Please send notice within 24 hours of obtaining valid data, of the results of all drinking water samples that exceed any EPA or Department-established maximum contaminant level, maximum residual disinfectant level or reportable concentration. Notice should be emailed to SpectrumLabResults@EurofinsUS.com.

Please notify <u>SpectrumLabResults@EurofinsUS.com</u> immediately and prior to conducting analysis if certification is not held for the analyses requested.

Please e-mail results in electronic format to SpectrumLabResults@EurofinsUS.com.

Received ON ICE

Released By Rute 10-12-17 Torsh Barg Protect 10/12/17
Date Received By Date Temp °C

Released By Date Received By Date

NEB SALTWATER SPEC_ 3 ACCLIMATION RECORD

Species:	Client:	Quantity:	*Mortality upon arrival
Menidia beryllina	Test ID:	000	Ç
Source:	LOT#: SS(7AIL (10-10)	Age:	∨)
Aquatic Indicators	\	9 days on 10.10:17	* Mortality > 10% - Notify management
		7	

Allowable Mortality: > 5% mortality = Notify management.

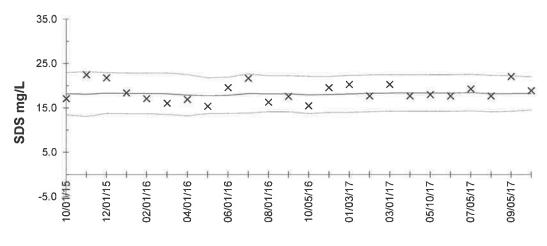
Fish = No more than 50% tank volume water change over a 12 (twelve) hour period. Allowable Acclimation:

Mysids = Need to be +/- 2 ppt of test dilution water.

	Comments / Treatment type		Acclimated to ASW H ₂ o ム い しに ASW
	Mortalities	# of dead organisms removed from tank	
Observations	Do organisms look stressed?	Yes / No	2 2
Obser	Behavioral observations	A = Normal, B = Erratic mov. C = Dead	7 7
	Feedings	AM NOON PM	在
	Sal. (ppt)		22 12 12
	Alkal. (mg/L) ml titrant		S 23.
LI,	emp. C) *		23.5
Water Chemistry	p.H. (SU)		52 ()
Water	D.O. (mg/L)		6 - 1 - 9
	Date		5.0) M. 01.01 P.T 11-11.01

New England Bioassay Reference Toxicant Data: *Mysidopsis bahia* 48-hour LC50

Reference Toxicant: Sodium Dodecyl Sulfate Test Dates: Oct 2015 - Oct 2017

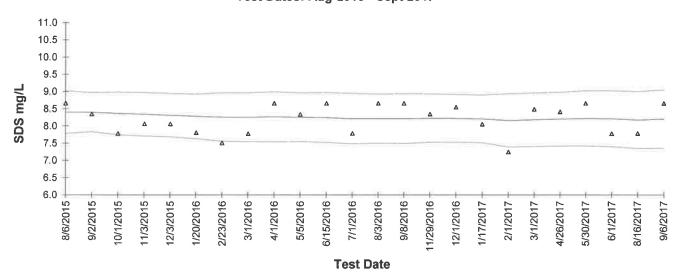


		Test Date	
×	LC50	Mean LC50	± 2 SD

								CV National
Test ID	Date	LC ₅₀	Mean LC ₅₀	STD	-2STD	+2STD	CV	75th & 90th%
15-1458	10/1/2015	17.1	18.2	2.4	13.5	23.0	0.13	0.26
15-1687	11/2/2015	22.5	18.1	2.5	13.1	23.2	0.13	0.26
15-1776	12/1/2015	21.8	18.4	2.3	13.8	23.0	0.14	0.26
16-34	1/4/2016	18.4	18.3	2.3	13.7	22.9	0.13	0.26
16-142	2/1/2016	17.1	18.3	2.3	13.7	22.8	0.12	0.26
16-338	3/8/2016	16.1	18.2	2.3	13.6	22.9	0.12	0.26
16-460	4/1/2016	16.9	17.9	2.3	13.2	22.5	0.13	0.26
16-600	5/2/2016	15.4	17.8	2.0	13.7	21.8	0.13	0.26
16-709	6/1/2016	19.6	17.9	2.0	13.8	22.0	0.11	0.26
16-849	7/1/2016	21.7	18.3	2.2	13.8	22.7	0.11	0.26
16-1058	8/1/2016	16.3	18.2	2.0	14.1	22.2	0.12	0.26
16-1256	9/7/2016	17.6	18.2	2.0	14.1	22.3	0.11	0.26
16-1471	10/5/2016	15.5	17.9	2.1	13.7	22.1	0.11	0.26
16-1590	11/1/2016	19.6	18.0	2.0	14.0	22.1	0.12	0.26
17-9	1/3/2017	20.3	18.2	2.1	14.0	22.4	0.11	0.26
17-154	2/1/2017	17.7	18.3	2.1	14.1	22.4	0.11	0.26
17-273	3/1/2017	20.3	18.4	2.1	14.3	22.5	0.11	0.26
17-479	4/4/2017	17.7	18.4	2.1	14.2	22.5	0.11	0.26
17-697	5/10/2017	18.0	18.4	2.1	14.2	22.5	0.11	0.26
17-776	6/1/2017	17.7	18.4	2.1	14.2	22.5	0.11	0.26
17-977	7/5/2017	19.3	18.5	2.1	14.3	22.6	0.11	0.26
17-1144	8/1/2017	17.7	18.2	2.0	14.1	22.3	0.11	0.26
17-1329	9/5/2017	22.1	18.3	2.0	14.2	22.3	0.11	0.26
17-1520	10/2/2017	18.9	18.3	1.9	14.6	22.0	0.10	0.26

New England Bioassay Reference Toxicant Data: *Menidia beryllina* 48-hour LC50

Reference Toxicant: Sodium Dodecyl Sulfate Test Dates: Aug 2015 - Sept 2017



Mean LC50

LC50

+/- 2 STD

								CV National	CV National
Test ID	Date	LC ₅₀	Mean LC ₅₀	STD	-2STD	+2STD	CV	75th%	90th%
15-1083	8/6/2015	8.7	8.4	0.3	7.8	9.0	0.04	0.21	0.44
15-1297	9/2/2015	8.4	8.4	0.3	7.8	9.0	0.03	0.21	0.44
15-1539	10/1/2015	7.8	8.4	0.3	7.7	9.0	0.04	0.21	0.44
15-1688	11/3/2015	8.1	8.3	0.3	7.7	9.0	0.04	0.21	0.44
15-1825	12/3/2015	8.1	8.3	0.3	7.7	8.9	0.04	0.21	0.44
16-108	1/20/2016	7.8	8.3	0.3	7.6	8.9	0.04	0.21	0.44
16-260	2/23/2016	7.5	8,3	0.4	7.6	9.0	0.04	0.21	0.44
16-303	3/1/2016	7.8	8.3	0.4	7.5	9.0	0.04	0.21	0.44
16-461	4/1/2016	8.7	8.3	0.4	7.5	9.0	0.04	0.21	0.44
16-602	5/5/2016	8.3	8.3	0.4	7.5	9.0	0.04	0.21	0.44
16-798	6/15/2016	8.7	8.2	0.4	7.5	9.0	0.04	0.21	0.44
16-850	7/1/2016	7.8	8.2	0.4	7.5	8.9	0.04	0.21	0.44
16-1060	8/3/2016	8.7	8.2	0.4	7.5	8.9	0.04	0.21	0.44
16-1282	9/8/2016	8.7	8.2	0.4	7.5	8.9	0.04	0.21	0.44
16-1705	11/29/2016	8.4	8.2	0.4	7.5	8.9	0.04	0.21	0.44
16-1739	12/1/2016	8.6	8.2	0.3	7.5	8.9	0.04	0.21	0.44
17-83	1/17/2017	8.1	8.2	0.3	7.5	8.9	0.04	0.21	0.44
17-155	2/1/2017	7.3	8.2	0.4	7.4	8.9	0.05	0.21	0.44
17-278	3/1/2017	8.5	8.2	0.4	7.4	9.0	0.05	0.21	0.44
17-595	4/26/2017	8.4	8.2	0.4	7.4	9.0	0.05	0.21	0.44
17-758	5/30/2017	8.7	8.2	0.4	7.4	9.0	0.05	0.21	0.44
17-777	6/1/2017	7.8	8.2	0.4	7.4	9.0	0.05	0.21	0.44
17-1246	8/16/2017	7.8	8.2	0.4	7.3	9.0	0.05	0.21	0.44
17-1340	9/6/2017	8.7	8.2	0.4	7.4	9.0	0.05	0.21	0.44

CHAIN OF CUSTODY RECORD

☐ Rush TAT - Date Needed:

☑ Standard TAT - 7 to 10 business days

Special Handling:

F=Field Filte	Project Mgr.	Telephone #:	lo	12	-0	Report To: A	SI
red I=Na ₂ S20			Chelsea, MA 02150	281 Eastern Ave	Gulf Oil LP	Report To: Andrew Adams	SPECTRUM ANALYTICAL, INC. Featuring HANIBAL TECHNOLOGY
O ₃ 2=HCl	Andrew Adams	617.884.5980	0				YTICAL, INC.
3=H2SO4	Adams	4.5980					*
4=HNO,							3
5=NaOH	P.O					Invoice	
$ \textbf{F=Field Filtered} \qquad \textbf{1=Na}_2S2O_1 \qquad \textbf{2=HC1} \qquad \textbf{3=H}_2SO_4 \qquad \textbf{4=HNO}_3 \qquad \textbf{5=NaOH} \qquad \textbf{6=} Ascorbic Acid $	P.O No.:		Wellesley, MA 02481-3705	80 William St, Suite 400	Gulf Oil LP	Invoice To: Christopher Gill	Page
	Quote/RQN:		2481-3705	ite 400			Page1 of1
-							
list Preservative Cade helaw:		Sampler(s):	Location:	Site Ivalia.	City Nigary	Project No:	
le helow:			281 Eastern Ave, Chelsea	Cun Choloca Formina	Gulf Chelses Terminal	Gulf Chelsea	All TATs subject to laboratory approval Min. 24-hr notification needed for rushes Samples disposed after 60 days unless otherwise instructed
anneting Va			State: MA				al hes otherwise instr
			MA				nıcted

Present Intact Hroken	Seals:	Custody Seals:	receipt	Condition upon receipt	Cond	Connected 4,2										(
						Concediant sector	SASI		111110	101		*	M		De la	Strate Co	(
gulfoil.com	aadams@gulfoil.com, cgill@gulfoil.com	ns@gulfor		E-mail to:	S	U ₁ 2	1030		10-11-17	10-1		Der	Teste?	A		Am	
			nat:	EDD format		Temp °C			Date:			by:	Received by:		shed by:	/Relinquished by:	
			_														
Zn - 5 µg/L																	
Cu - 0.5 μg/L	0																6
Cd, Pb, Ni - 0.2 ug/L		×								WS	6	2780	10-11-17	*	Chelsea Creek		
Group 2 PAHs - 5 µg/L			×				_			WS	0	5480	10-11-17	*	Chelsea Creek		
Group 1 PAHs - 0.1 µg/L	Ö		×						N/g	WS	G	i dal +	* Fil at Lab!	*	Chelsea Creek		
naphthalene - 5 µg/L				×				Po	ندر	ws	9	0842	10-11-17	*	Chelsea Creek		
BTEX - 2 µg/L	0				×			-	S	ws	6	5480	10.11.17	*	Chelsea Creek		
Required Minimum Levels:						×	-			SW	G	0841	10-11-17	×	Chelsea Creek	-	
' Report metals down to the MDL	0					×	-			WS	6	5480	10-11-01	×	Chelsea Creek	22501	646
		LC50	TOC Total Re Pb, Ni, Z	PAHs	5038550	Ammonia TRC, sal	# of Plas	# of Clea	# of VO	Matrix	Type	Timet	C=Compsite Date:		srab Sample ID:	G= Grab	
□ No Øc	chlorinated		cov. (Cd, Cu,		naphthalene	inity, pH, TS,	tic	-				Gas	nt Air 8G=Soil Gas	A=Indoor/Ambient Air X2=	SL=Sludge A=ir	XI=	0=0;1
MA DEP MCP CAM Report! Yes No			is	Analysis			ers	Containers		Turnit .	4	ww=Waste Water	SW=Surface Water WW	SW=Surf	GW=Groundwater	DW=Dinking Water	DW
			10 4	11	2	3 11	1										
* additional charges may appply		9	Conche	Tiesel value cone neiow.	CBL I I E	-					12=	none	=11	r 10=H ₃ PO.	7=CH3OH 8=NaHSO ₄ 9=Deionized Water 10=H ₃ PO ₄	H3OH 8=NaHSO	7=C

* Note: AECOM Authorizes Eurofins to fill 2 Victs for TOC analysis. (Hz PO4) Total of 11 bottles should be analyzed!

Rev. Jan 2014

5240225

SPECTRUM ANALYTICAL, INC.

CHAIN OF CUSTODY RECORD

☐ Standard TAT - 7 to 10 business days
☐ Rush TAT - Date Needed:

Special/Handling:

*FII at Labi G SW *	10-11-17	41-11-01	Condition upon receipt Custody Seals: Present		X2= X2= Seek Seek Seek Seek Seek Seek Seek See	SG-Soil Gas X3= C=Compsite Date: Time: 0-11-17 0845 0-11-17 0845 6-11-17 0845 Fill at Lab! S-11-17 0845 Fill at Lab! Received by: Received by:	20 20 20 20 20 20 20 20	Date: ω ω # of VOA Vials		# of Clear Glass	Time: # of Plastic	Color T × Ammonia	TRC, salinity, pH, TS	□ □ × BTEX & naphthalene	ED X PAHs	TOC	Total Recov. (Cd, Cu. Pb, Ni, Zn)*	But of	com, c	a d d d d d d d d d d d d d d d d d d d
C=Compsite C=C	# / O - 1 - 1 - 1	C=Compsite C=C	C=Compsite C=Comp	C-Compsile C-C	A =Indo				S				H, TS,	alene			i, Cu,			[2] Standard
Sea Creek 10 -11 -17 08 45 Go Sw Matrix Work 10 -11 -17 08 45 Go Type Matrix Work	A=Indoor/Ambient Air SG=Soil Gas N2=	Sea Creek 10-11-17	A-Indon/Ambient Air Sc. Soll Gas Nature	A Indon/Ambient Air SG Soil Gas X3									,				*		•	00
Sea Creek 10 -11 -17	Sea Creek	Sea Creek 10 -11 -17	Sea Creek 10 -11 -17 08 4 5 G SW Sea Creek 10 -11 -17 08 4 5 G SW Sea Creek 10 -11 -17 08 4 5 G SW Sea Creek 10 -11 -17 08 4 5 G SW Sea Creek 10 -11 -17 08 4 5 G SW Sea Creek 10 -11 -17 08 4 5 G SW Sea Creek 10 -11 -17 08 4 5 G SW Sea Creek 10 -11 -17 08 4 5 G SW Sea Creek 10 -11 -17 08 4 5 G SW Sea Creek 10 -11 -17 08 4 5 G SW Sea Creek 10 -11 -17 08 4 5 G SW Sw Matrix 4 of Amber Glass 4 of Clear Glass 4 of Clear Glass 5 of Plastic	C - Compsile Name									TS,	ene			Cu,			
10 -11 -17	*	C=Compsite C=C	C-Compsite C-C	C-Compsite C-C	SL=Sludge A=Indoor/A				S				ł, TS,	alene			, Cu,			наши
10 -11 -17	*	C=Compsite C=C	C - C ompsite	C-Compsite Time: Type Date: Time: Type Date: Time: Type Date: Type Date:					S				ł, TS	alen			l, Cu		1000	нац
C=Compsile C=C	# 7 1 C C C C C C C C C	C=Compsile C=C	C=Compsite C=C	C=Compsite Custody Seeds Check if cl	X2=	X3=				lass			y, pH	phtha						HOLD
10 -11 -17	# Fill at Lab! 6 SW Ma /0-11-17 0845 6 SW Ma /0-11-17 0845 6 SW Ma # of: ** Amn ** TRO Tota Ph.; Che Che	Date: Time:	Date: Time: Ty Ma	Date: Time: Ty Ma					-	_	Plastic	nonia	, salin	X & n	s			0		
10-11-17 0842 6 SW # # # # # A TT B P T TP L	# # # # # # # # # # # # # # # # # # #	10-11-17 0842 G SW # # # # # A TT B P T TP L (10-11-17 0842 G SW 3	10 -11 -17	10 -11 -17			_		-	-	of I	mm		TE:	AH:	oc		.C50	N	
10-11-17 0842 e sw 3 1 × ×	10-11-17 0842 6 SW 1 1 X X	10-11-17 0845 6 SW 1 1 X	10 - 11 - 17 0845 6 SW	10 -11 -17	ample ID:	· Time;	-		-	-	= of	Am		ВТ	PAI	то		LC	01	
10-11-17 0847 6 SW 3 1 X X X X X X X X X X X X X X X X X X	*FIII at Lab! 6 SW 3 X X X X X X X X X X X X X X X X X X	10-11-17 0845 G SW 1 X X X X X X X X X X X X X X X X X X	10-11-17	10 - 11 - 17	elsea Creek	5480		/			_	×								
10-11-17 0842 6 8M 3 X X X	10-11-17 0842 e sw 3 x x = 0	10-11-17 0842 6 SW 3 X X X X X X X X X X X X X X X X X X	10-11-17	10 -11 -17	nelsea Creek	2030	_	,			->		×						-	
10-11-07 S 7 3 6 SW X	10-11-17 O8175 G SW 2 X X III	* Fill at Lab! 6 sw 2 x x	10-11-17	10-11-17	halsaa Creek	2000	-	1						×					-	_
	*Fill at Labi o sw *	* Fill at Lab! 6 SW * X	# Fill at Labi 6 SW 1 1	# Fill at Lab! G SW	helsea Creek	0875	-		B						×					_
10-11-15 OSYS O F1-11-01 X O SYSO F1-11-01	10-11-12 0 848 0 41-11-01		Received by: Date: Time: Temp °C Conserved Lo-11-17 LOSO Lo-11-17 LOSO Correcting Feater [O 11 17 1545 Correc	Received by: Date: Time: Temp °C Observed Lo-ii-i7 1030 UC2 Concepting flavor Official 1545 Companies Companies Condition upon receipt: Custody Seals: Present					uurei					X						
10-11-17 0842 e sw 1 1 x = 0	10-11-03 8 8W 1 1 × 0	. ×	Received by: Date: Time: Temp °C Display Temp °C Temp °C Display Temp °C Temp °C Display Temp °C Te	Received by: Time: Temp °C Lo-11 : 7 2550 42 5 5 5 5 5 5 5 5 5	201 1/							-							,,,,,	Lud
10-11-01 NS 9 5780 41-11-01 NS 9 5780 41-11-01	10-11-01 X × 0 × 0 × 0 × 0 × 0 0	. X	Date: Time: Temp °C ☐ EDD format: 10-11-17	Pate: Time: Temp °C	AMP A A															-
1	10-11-01 X	. X	1545 Observed 2 E-mail to:	1 2 2 Condition upon receipt Custody Seals Present		Received by:		Date:		7	Time:	Te	mp °C		EDD f	ormat:				
10-11-17	10-11-17	iby: Time: Temp °C	1545	1 SHS Cornection Factor Cornected Cornected Condition upon receipt: Custody Seals: Present	(De ste Oc	10	1. 11-6	4	12:2	020	Chanto .	5	1	E-mail	to:	aadans	@gulfoi	com, c	gill@g
10-11-17	10-11-17	Time: Temp °C C EDD format: According to: andams@gulfoil.com, cgill@gulfoil.com		Comment Condition upon receipt Custody Seals Present	^		76	0/11/1	٧	_	1	Conce	tion Factor							

Mote: AECOM Authorizes Eurofins to fill 2 Vials for TOC analysis (Hz POY)

Total of 11 bottles should be analyzed!

*

Rev. Jan 2014

SC 96230 Prospecial Handling:

SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

☐ Rush TAT - Date Needed:

☑ Standard TAT - 7 to 10 business days

F=Field Filtered 1=Na ₂ S2O ₃ 2=HC1 3=H ₂ SO ₄ 4=HNO ₃ 5=NaOH 6=Ascorbic Acid	Project Mgr.	Telephone #:	Chelsea,	281 Eastern Ave	Guff Oil LP	Report To: Andrew Adams	SPECTRU
I=Na ₂ S2O ₃			Chelsea, MA 02150	ern Ave	ס	dams	SPECTRUM ANALYTICAL, INC Featuring HANIBAL TECHNOLOGY
2=HCI	Andrew Adams	617.884.5980					AL, INC.
3=H ₂ SO ₄	ams	980					
4=HNO3							1
5=NaOH	P.C					Invoic	
6=Ascorbic Acid	P.O No.:		Wellesley, MA 02481-3705	80 William St, Suite 400	Gulf Oil LP	Invoice To: Christopher Gill	Page1
	Quote/RQN:		481-3705	ite 400			Page1 of2
List Preservative Cade below.		Sampler(s):	Location:	Sile Name:		Project No:	
			281 Eastern Ave, Chelsea	Guil Cheisea Leimina	C. F Challen Towning	Gulf Chelsea	All TAT's subject to laboratory approval Min, 24-hr notification needed for rushes Samples disposed after 60 days unless otherwise instructed
0.000			State: MA				es therwise instructed.

☐ DI VOA Frozen ☐ Soil Jar Frozen	☐ Refrigerated	Refrige		Ambient Iced	mbient	Z.	5,00	#CII RII		-										
□ Present □ Intact □ Broken	eals:	Custody Seals:		Condition upon receipt	on upo	Condit	Corrected 2	Cor)	(Ċ	6	(
jennifer.atkins@aecom.com	jennife						Correction Factor	Corr	1545	7	5/11/0	10		1	N.		•	Dr.	10000	D.
aadams@gulfoil.com, cgill@gulfoil.com, and	com, cgi	ulfoil.c	dams@g		E-mail to:	S	Sharred L. 2		1030		10-11-17	10)ec	Port	0			Ly/	1
				mat:	EDD format:		Temp °C		Time:		Date:			by:	Received by:			Relinquished by:	Reling	
																			>	
																			*	(
Group 2 PAHs - 5 µg/L	×	1000									2	SW	G	0900	10-11		Outfall 003			7
Group 1 PAHs - 0.1 µg/L		^	×						_	lane:		WS	G	0900	10-11		Outfall 003			
ethanol - 400 μg/L		-	×							2		WS	G	0900	10-11		Outfall 003			
naphthalene and vinyl chl - 5 µg/L				×	×						ω	WS	G	0900	10-11		Outfall 003	٠		
BTEX - 2 μg/L; TBA - 10 μg/L;		-				×				-		WS	G	0900	10-11		Outfall 003			
Required Minimum Levels:	.0	-		-			×		_			WS	G	0500	10-11		Outfall 003			۲.
* Report phenol down to MDL							×		1			WS	G	0900	10-11		Outfall 003		00	40230
State-specific reporting standards	Che	-	-	Etha	TBA	0&0	TSS	_		-	-	Ма	T	Time:	Date:		Sample ID:	s	D:	Lab ID:
l			ls and	inol	•	3	nonia		Plastic	Ambe	VOA	atrix	ype		C=Compsite			G= Grab	G=	
□ Sandard □ No QC □ DQA* □ ASP B*	hlorinated	or m	total phenol*	ide, MTBE +	htha-lene,			_		r Glass Glass		: h		l Gas	t Air SG=Soil Gas	A=Indoor/Ambient Air X2=	₩. · · · · ·	SL=Sludge	SO=Soil	NI=
MA DEP MCP CAM Report! Yes No				ysis	Analysis				iners	Containers			_	ww=Waste Water		SW=Surface Water	GW=Groundwater	GW=Gro	DW=Dinking Water	DW=Din
A manufacture county from the first	6	-	11 11	2	2	ü	3 11		1											
* additional charges may approb				- cour	Contract Con	100.1	To the state of			65		ľ	12=	none	=11	10=H,PO4	7=CH3OH 8=NaHSO ₄ 9=Deionized Water 10=H ₃ PO ₄	SO ₄ 9=Deio	H 8=NaH	7=CH30

F=Field Filtered 1=Na ₂ S2O ₃ 2=HCl 3=H ₂ SO ₄ 4=HNO ₃ 5=NaOH 6=Ascorbic Acid	Project Mgr.	Telephone #:	Chelse	281 Ea	Gulf Oil LP	Report To: Andrew Adams	SPECTI	
1=Na ₂ S2O ₃	ľ		Chelsea, MA 02150	281 Eastern Ave	ILP	/ Adams	SPECTRUM ANALYTICAL, INC. Featuring HANIBAL TECHNOLOGY	12
2=HCI	Andrew Adams	617.884.5980					AL, INC.	
3-H,SO,	dams	980						
4=HNO;							3	
5=NaOH	7					Invo		CH
6=Asco	P.O No.:		Well	W 08	Gulf	Invoice To: Christopher Gill		AIN
rbic Acid			Wellesley, MA 02481-3705	80 William St, Suite 400	Gulf Oil LP	topher Gill	Page 2 of	OF C
	Quote/RQN:		481-3705	ite 400			of,	USTO
	QN						12	DY
								CHAIN OF CUSTODY RECORD
T + D.			_)RD
Tiet Description Code below.		Sampler(s):	Location:	SHE NAME.	City	Project No:		
la kalama			281				All T. Min. Sampl	☑ /Stand
	- 10 (10 m) (10		281 Eastern Ave, Chelsea	Gun		130-1	ATs subject to 24-hr notifies les disposed a	Special Han Standard TAT - 7 to 10 bu Rush TAT - Date Needed:
			e, Chelsea	Gui Cheisea Leithlia	Cholego To	Gulf Chelsea	All TATs subject to laboratory approval Min. 24-hr notification needed for rushes Samples disposed after 60 days unless oth	Special Handling: Standard TAT-7 to 10 business days Rush TAT-Date Needed:
			100	a line	3	a	All TATs subject to laboratory approval Min. 24-hr notification needed for rushes Samples disposed after 60 days unless otherwise instructed.	ing: ess days
			State: MA				ise instruct	

, " additional charges may apppiy					
QA/QC Reporting Notes:	e below:	List Preservative Code below:	4=HNO ₃ 5=NaOH 6=Ascorbic Acid 11= none 12=	Field Filtered 1=Na ₂ S2O ₃ 2=HCl 3=H ₂ SO ₄ 4=HNO ₃ 5 CH3OH 8=NaHSO ₄ 9=Deionized Water 10=H ₃ PO ₄ 11=	Field Filtered TH3OH 8=
		1	P.O No.: Quote/RON:	Andrew Adams	ject Mgr.
		Sampler(s):		617.884.5980	ephone #:
281 Eastern Ave, Chelsea State MA	281 Eastern	Location:	Wellesley, MA 02481-3705	Chelsea, MA 02150	Chel
Can Chaisea Lamina		Sile Name	80 William St, Suite 400	281 Eastern Ave	281
Sif Oboleon Tominal	o.	Si Ni	Gulf Oil LP	Gulf Oil LP	Gulf
Gulf Chelsea		Project No:	Invoice To: Christopher Gill	ew Adams	port To: Andrew Adams
	ACCOUNT OF THE PROPERTY OF THE			HAVIBAL JECHNOLOGY	11/

Jornal Same.	Carlo reduction Strates		11= none 12=	CH3OH 8=NaHSO ₄ 9=Deionized Water 10=H ₁ PO ₄
OA/OC Reporting Notes:	OA/OC Ron	List Preservative Code below:	4=HNO ₃ 5=NaOH 6=Ascorbic Acid	
			P.O No.: Quote/RQN:	Andrew Adams
		Sampler(s):		lephone #: 617.884.5980
State: MA	281 Eastern Ave, Chelsea	Location: 281	Wellesley, MA 02481-3705	Chelsea, MA 02150
	Gui Cheisea Leithlia	one name	80 William St, Suite 400	281 Eastern Ave
	Out Obelon Tominal	0.5	Gulf Oil LP	Gulf Oil LP
	Gulf Chelsea	Project No:	Invoice To: Christopher Gill	eport To: Andrew Adams

Condition Cond	□ Present □ Intact □ Broken	Custody Seals:	Condition upon receipt	Competed 2							((
Contail St. Studge	atkins@aecom.com	jennifer.s		Correction Factor	1845	111/17	6		J1	R	Der .	Da's
Orl 8 *NaHNO, 9-Deionized Water 10+HyPO, 11= none 12=	@gulfoil.com, and	aadans@gulfoil.com, cgill@		Cloured Class	1030	41-11-	10		Dec	Laso S	2	14//2
Col. 8-NailSQ, 9-Deionized Water 10+H/OL 11= none 12=				Temp °C	Time:	Date:			d by:	Receive	shed by:	/ Relinga
OH 8-NailSO ₄ 9-Deionized Water 10+H ₂ PO ₄ 11= none 12= III												
Containers												
OH 8 - NaHSO ₄ 9 - Deionized Water 10-H ₂ PO ₄ 11 none 12 Native Containers Containers Total Recov. Zo. Analysis # Additional charges may apply and the containers Analysis	Zn - 5 µg/L											
OH	Cr-1 µg/L											
Containers Con	Cu - 0.5 µg/L	0										
OH 8-NaHSO4 9-Deionized Water 10-H ₃ PO4 11= none 12= Containers 11 11 11 11 .**additional charges may apply notes inking Water GForoundwater SW-Surface Water WW=Waste Water Containers Containers Analysis MA DEP MCP CAM Report Yes SO-Soil SL-Sludge A-Indoor/Ambient Air SG-Soil Gas SC Containers Analysis MA DEP MCP CAM Report Yes Sandard X2= X3= X3= Yes Ags as a first of CLs	Cd, Pb, Ni - 0.2 ug/L											9
OH 8=NaHSO, 9=Deionized Water 10=H ₃ PO ₄ III none 12= Containers SO=Soil SL=Studge A=Indoor/Ambient Air SG=Soil Gas X2= X2= X3= C=Compsite C=Compsite SD: Sample ID: Date: Time: Date: Time: Type X = III none 12= Containers Containers Containers Containers Containers Containers Analysis Analysis MA DEP MCP CAM Report Yes CT DEP RCP Report	Required Minimum Levels:	0	×				WS	G	0900		Outfall 003	
OH 8=NaHSO ₄ 9=Deionized Water 10=H ₃ PO ₄ 11= none 12= Analysis Containers Containers	**LC50 sub to GZA			×	-		WS	- 30	0900	10-11	Outfall 003	
OH 8=NaHSO, 9=Deionized Water 10=H ₁ PO ₄ 11= none 12= MADEP MCP CAM Report: Yes	* Report metals down to MDL	0		×	4		WS	G	0900	10-11	Outfall 003	10230-1
OH 8=NaHSO, 9=Deionized Water 10=H ₁ PO ₄ 11= none 12= 11 11 11 11 11	14	Check	LC50	Total			Mati	Typ		Date:	Sample ID:	Lab ID:
THE None 12= TH	0000	k if chlorinated	**	Recov. (Cd, Cr,			rix	ne	ilGas	?	=Sludge	SO=S0
11= none 12= - 11 11 11	O Yes		Analysis		ntainers	Con			W=Waste Wate			DW=Dinking Water
II= none II=				\vdash								
	* additional charges may appply	de below.	CI I CSCI YAUYE CO					_ 12=			O ₄ 9=Deionized Water 10=	7=CH3OH 8=NaHS

CHAIN OF CUSTODY RECORD

	X
Special Handling: Standard TAT - 7 to 10 business day	46230
pecial Handling: AT - 7 to 10 business days	3
	<

DI VOA Frazen Soil lar How		Ruffingrated			Ambiant low	7	7	IR ID#		7012							
☐ Present ☐ Intact ☐ Broken ∧		Custody Seals:		n receip	Condition upon receipt	Condit	Connected 7	Comed)	(((
jennifer.atkins@aecom.com	jennife						Correction Factor	Correct	1545	15	11/17	10/11		5	7		Dason Con
aadams@gulfoil.com, cgill@gulfoil.com, and	com, cgil	gulfoil	adants@		E-mail to:		2.7	Speared	1030	2	-17	10-11-17	1)ac	Para	1	Hall
W. Tribin				mat:	EDD format:		Temp °C	Te	Time:	(v)	15	Date:		by:	Received by:	hed by:	// Relinquished by:
2 10/12																	
TB added per Chient	0	-		X	X)	2			10-11	TripBlank	5
																	4
Group 2 PAHs - 5 µg/L	×				A Feet Prince			A				2	G SW	0900	10-11	Outfall 003	
Group 1 PAHs - 0.1 μg/L		×							-			>	G SW	0900	10-4	Outfall 003	
ethanol - 400 μg/L			×								N	>	G SW	0900	10-11	Outfall 003	
naphthalene and vinyl chl - 5 μg/L				×	×							2	G SW	0900	10-11	Outfall 003	
BTEX - 2 μg/L; TBA - 10 μg/L;						×					_	>	G SW	0900	10-11	Outfall 003	
Required Minimum Levels:		_	_				×		-			>	G SW	0000	10-11	Outfall 003	
* Report phenol down to MDL								×	7			>	G SW	0900	10-11	Outfall 003	4023001
State-specific reporting standards:	Che		-	Etha	TBA	0&0	TSS	Amr	# of	# of	# of	2,240		Time:	Date:	Sample ID:	Lab ID:
		d Colif		inol	'`			nonia	Plasti	Clear	Ambe	VOA	ype		C=Compsite	rab	G= Grab
Standard O No QC O DQA* ASP A* ASP A* ASP B*	hlorinated	orm	total phenol*	ride, MTBE +	ohtha-lene,				2	Glass	r Glass	Vials		Gas	nt Air SG=Soil Gas	SL=Sludge A=Indoor/Ambient Air N2=	0=0il 80=Soil
Ceport?				ysis	Analysis				r's	Containers	C			WW=Waste Water		GW =Groundwater SW =Surface Water	DW=Dinking Water
QA/QC Reporting Notes: * additional charges may appply	10	3		e Code I	List Preservative Code below:	st Pres	= =	ω				cid	6=Ascorbic Acid	5=NaOH 6=As	4=HNO ₃	1=Na ₂ S2O ₃ 2=HCl 3=H ₂ SO ₄ SO ₄ 9=Deionized Water 10=H ₃ PO ₄	F=Field Filtered 1=Na 7=CH3OH 8=NaHSO ₄
				1			£	e e		Quote/RQN:	Quot			P.O No.:		Andrew Adams	Project Mgr.
				(s):	Sampler(s):	1352											Telephone #:
281 Eastern Ave, Chelsea State: MA	stern Av	281 Ea		l	Location:		1				81-3705	MA 024	Wellesley, MA 02481-3705	×		02150	Chelsea, MA 02150
Gulf Chelsea Terminal	Gulf			<u>s</u>	Site Name:	1	E I				e 400	St, Suite	80 William St, Suite 400	8C		Ave	281 Eastern Ave
							15 1					a l	Gulf Oil LP	စ္ခ			Gulf Oil LP
Gulf Chelsea	W. 10			lo:	Project No:	_	i.					r Gill	nistophe	Invoice To: Christopher Gill		ns	Report To: Andrew Adams
All TATs subject to laboratory approval Min. 24-hr notification needed for rushes Samples disposed after 60 days unless otherwise instructed.	subject to hr notifica lisposed a	II TATs lin 24-l amples d	Sa M							2	<u>o</u> ,		Page		1	SPECTRUM ANALYTICAL, INC. Featuring HANIBAL TECHNOLOGY	SPECTRUM / HANIBAL
Rush TAT - Date Needed:	T - Date	ush TA	□ R1				NS.	ECC	Y	Q D	SI		9	CHAIN OF CUSTODY RECORD			

Batch Summary

'[none]'

Subcontracted analyses

SC40225-01 (Chelsea Creek) SC40230-01 (Outfall 003)

1717324

General Chemistry Parameters

1717324-DUP1 1717324-SRM1 1717324-SRM2

SC40225-01 (Chelsea Creek) SC40230-01 (Outfall 003)

1717339

Volatile Organic Compounds

1717339-BLK1 1717339-BS1 1717339-BSD1 SC40225-01 (Chelsea Ch

SC40225-01 (Chelsea Creek) SC40230-01 (Outfall 003)

<u>1717498</u>

General Chemistry Parameters

1717498-BLK1 1717498-BS1 1717498-DUP1 1717498-MS1 1717498-MSD1 1717498-SRM1

SC40225-01 (Chelsea Creek) SC40230-01 (Outfall 003)

1717566

Semivolatile Organic Compounds by GCMS

1717566-BLK1 1717566-BLK2 1717566-BS1 1717566-BS2 1717566-BSD1 1717566-BSD2

SC40225-01 (Chelsea Creek)

<u>1717578</u>

General Chemistry Parameters

1717578-BLK1 1717578-BS1 SC40225-01 (Chelsea Creek) SC40230-01 (Outfall 003)

1717579

General Chemistry Parameters

1717579-BLK1

1717579-BS1

SC40225-01 (Chelsea Creek) SC40230-01 (Outfall 003)

1717670

General Chemistry Parameters

1717670-DUP1 1717670-SRM1 1717670-SRM2

SC40225-01 (Chelsea Creek) SC40230-01 (Outfall 003)

1717748

General Chemistry Parameters

1717748-BLK1 1717748-BS1 1717748-CCB1 1717748-CCB2 1717748-CCB3 1717748-CCV1 1717748-CCV2 1717748-CCV3 1717748-SRM1 SC40225-01 (Chelsea Creek) SC40230-01 (Outfall 003)

1717901

Semivolatile Organic Compounds by GCMS

1717901-BLK1 1717901-BLK2 1717901-BS1 1717901-BS2 1717901-BSD1 1717901-BSD2

SC40230-01RE1 (Outfall 003)

405439A

Subcontracted Analyses

BZ19754-BLK BZ19754-DUP BZ19754-LCS BZ19754-MS

SC40225-01 (Chelsea Creek) SC40230-01 (Outfall 003)

405870A

<u>Subcontracted Analyses</u>

BZ19769-BLK BZ19769-LCS BZ19769-LCSD SC40230-01 (Outfall 003)

B188766	
Metals Analyses (Total)	<u>8708921</u>
B188766-BLK1	Semivolatile Organic Compounds by GCMS
B188766-BS1	S708921-CAL1
B188766-BSD1	S708921-CAL2
SC40225-01 (Chelsea Creek)	S708921-CAL3
SC40230-01 (Outfall 003)	S708921-CAL4
5C+0250-01 (Outlail 005)	S708921-CAL5
S705799	S708921-CAL6
General Chemistry Parameters	S708921-CAL7
	S708921-CAL8
S705799-CAL1	S708921-CAL9
S705799-CAL2 S705799-CAL3	S708921-CALA
\$705799-CAL3 \$705799-CAL4	S708921-ICV1
\$705799-CAL5	S708921-LCV1
\$705799-CAL5 \$705799-CAL6	S708921-LCV2
\$705799-CAL7	S708921-LCV3
\$705799-CAL8	S708921-TUN1
\$705799-ICB1	
\$705799-ICV1	<u>\$709010</u>
5/03/77-1C V 1	Volatile Organic Compounds
S708328	S709010-CCV1
Semivolatile Organic Compounds by GCMS	S709010-TUN1
S708328-CAL1	
S708328-CAL2	<u>\$709250</u>
S708328-CAL3	Semivolatile Organic Compounds by GCMS
S708328-CAL4	S709250-CCV1
S708328-CAL5	S709250-TUN1
S708328-CAL6	
S708328-CAL7	<u>8709253</u>
S708328-CAL8	Semivolatile Organic Compounds by GCMS
S708328-CAL9	S709253-CCV1
S708328-ICV1	S709253-TUN1
S708328-LCV1	
S708328-LCV2	<u>8709296</u>
S708328-TUN1	Semivolatile Organic Compounds by GCMS
	S709296-CCV1
<u>\$708779</u>	S709296-TUN1
<u>Volatile Organic Compounds</u>	
S708779-CAL1	<u>\$709340</u>
S708779-CAL2	Semivolatile Organic Compounds by GCMS
S708779-CAL3	S709340-CCV1
S708779-CAL4	S709340-TUN1
S708779-CAL5	
S708779-CAL6	<u>8709409</u>
S708779-CAL7	Semivolatile Organic Compounds by GCMS
S708779-CAL8	S709409-CCV1
S708779-CAL9	S709409-TUN1
S708779-CALA	2.2.0
S708779-CALB	S709413
\$708779-ICV1	Semivolatile Organic Compounds by GCMS
S708779-LCV1	S709413-CCV1
\$708779-LCV2	\$709413-TUN1

S708779-TUN1

S709413-TUN1